DOCUMENT RESUME

ED 068 716 VT 017 257

TITLE	Career Education and the Technology of Career Development.
SPONS AGENCY	American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif.
PUB DATE	72
NOTE	257p.; Proceedings of the Invitational Conference on Systems under Construction in Career Education and Development (8th, Palo Alto, Calif., October 7-8, 1971)
EDRS PRICE	MF-$0.65 HC-$9.87
DESCRIPTORS	*Career Education; *Conference Reports; Models; Occupational Guidance; Resource Materials; Speecnes; *Systems Development; *Technology; *Vocational Development

ABSTRACT

This report of proceedings includes numerous speeches, grouped in four topical areas: (1) systems for career education, (2) career development and systems at the American Institutes for Research, (3) current status of other career development systems, and (4) career education and the technology of career development. The Career Education Program's four models--school-based, employer-based, home-community based, and residential--are discussed. Career guidance and counseling, implementation problems, computer-free and computer-involved guidance systems, and related topics are covered. A wide range of resource materials is appended. (AG)

ED 068716

CAREER EDUCATION AND THE TECHNOLOGY OF CAREER DEVELOPMENT

The Proceedings of the Eighth Invitational Conference
on Systems under Construction
in Career Education and Development

AT017257

AMERICAN INSTITUTES FOR RESEARCH
Post Office Box 1113 / Palo Alto, California 94302

ED 068716

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

CAREER EDUCATION AND THE TECHNOLOGY OF CAREER DEVELOPMENT

The Proceedings of the
Eighth Invitational Conference on Systems under Construction
in Career Education and Development

at the
American Institutes for Research
Palo Alto, California 94302

7 - 8 October 1971

PREFACE

An Invitational Conference for Systems under Construction in Vocational Guidance was instituted in 1966 by several persons who had then recently received funds to involve the computer in guidance. Meetings have been voluntary.

The following Conferences have been held as part of this effort to stimulate the exchange of research innovation, mutual problems, and technology.

1. The Center for Vocational and Technical Education, The Ohio State University, Columbus, Ohio. August 18 and 19, 1966. David V. Tiedeman, Program Chairman. Conference report published by The Center. Out of print but available through ERIC. ED011039, VT001261
2. Systems Development Corporation. Santa Monica, California. February 27 and 28, 1967. John F. Cogswell, Program Chairman. No report was published.
3. International Business Machines Corporation, Advanced Systems Development Division. Yorktown Heights, New York. September 14 and 15, 1967. Frank J. Minor, Program Chairman. Report published and available from IBM.
4. American Institutes for Research. Palo Alto, California. March 8 and 9, 1968. John C. Flanagan, Program Chairman. Report published by the U.S. Office of Education through GPO. Contact Dr. Alice Scates, USOE.
5. Harvard University. Information System for Vocational Decisions. Cambridge, Massachusetts. October 11 and 12, 1968. David V. Tiedeman, Program Chairman. Harvard Project Annual Reports available through ERIC.
6. Willowbrook High School. Computerized Vocational Information System. Villa Park, Illinois. December 19 and 20, 1969. Jo Ann E. Harris and Robert E. Campbell, Program Chairmen. Report available through Miss Harris. ED049385 VT010764
7. Educational Testing Service, Princeton, New Jersey. October 12 and 13, 1970. Martin R. Katz, Program Chairman. No report was published.

The Eighth Conference was again held at the American Institutes for Research. My colleagues, Drs. John C. Flanagan and G. Brian Jones, assisted me greatly in planning and carrying out the Program of the Conference. Miss Nancy K. Brunstetter assisted in the arrangements for the Conference. Dr. G. Brian Jones assisted in editing these proceedings. Mrs. Sibyl Anderson, Miss Nancy Brunstetter, Miss Paulette Doudell, and Dr. Mary B. Willis served as editors and publishers with me.

David V. Tiedeman
Chairman

Palo Alto, California
15 July 1972

TABLE OF CONTENTS

Preface . . .
David V. Tiedeman iii

I. SYSTEMS FOR CAREER EDUCATION

Introduction 3

Career Education Now
Sidney P. Marland, Jr. 5

Plan for Career Education
Rue W. Harris 10

School-Based Model
Aaron J. Miller 17

Employer Based Career Education (EBCE)
B. H. Banathy 26

Another Employer-Based Model
Donald Swicord and Dean Des Roches 36

II. CAREER DEVELOPMENT AND SYSTEMS AT THE AMERICAN INSTITUTES FOR RESEARCH

Introduction 49

The Project TALENT Approach to the Career-Grouping Problem: Cutting the Gordian Knot
Marion F. Shaycoft 50

Some Findings from Project TALENT Regarding Career Plans
John C. Flanagan 65

Career Education and Guidance in the PLAN System of Individualized Education
James A. Dunn 81

A Comprehensive Career Guidance System in Action
G. Brian Jones, et al. 117

III. CURRENT STATUS OF OTHER CAREER DEVELOPMENT SYSTEMS

Introduction 129

Guidance in a Learning System

Advanced Instructional System
Walter F. Murphy 131

FSU Program BDA
John R. Bonar 134

OSU Operation Guidance - The Systems Approach: An Emerging Behavioral Model for Career Guidance
Robert E. Campbell and Warren N. Suzuki 140

Computer Free Guidance Systems

AEL Career Decision-Making Program
David W. Winefordner 142

EDUTEK Self-Instructional Mediated Career Education Project
Richard L. Douglass 146

Computer Involved Guidance Systems

Willowbrook Computerized Vocational Information System (CVIS)
JoAnn Harris 152

IBM Educational and Career Exploration System (ECES)
Al Mallory 156

IBM ECES: A Preliminary Report on the First Year of Field Trials in Genesee County, Michigan
Roger A. Myers 159

System of Interactive Guidance and Information
Warren Chapman 161

UM/W Computerized Guidance Programs
Russell N. Cassel 167

IV. CAREER EDUCATION AND THE TECHNOLOGY OF CAREER DEVELOPMENT

Introduction 175

The Basic Functions of an Effective Program for Career Guidance and Counseling

Introduction
Eugene Wilson 176

Planning Personal Development as Considered in the Conference and the United States Training and Employment Service
Jewel Boling 177

Learning to Manage Personal Development
Robert E. Campbell 189

Integration
Eugene Wilson 192

Relative Advantages of Available Procedures

Introduction
Allan B. Ellis 194

Career Education and Development Curricula
Dale Prediger 195

Integrating Media and Guidance Systems with Other Systems in the School District and Community
Gerald Dudley 198

Integration
Allan B. Ellis 200

Implementation Problems

Introduction
Roger Myers 202

Counselor and Vocational Educator Acceptance of Systems
Al Mallory 203

Training Counselor and Vocational Education Users
JoAnn Harris 205

Managing and Administering the New System
Tommy L. Roberts 208

Integration
Roger Myers 210

Afterword
Mary B. Willis and David V. Tiedeman 213

Appendices

Appendix A: Glossary of Key Concepts in Project PLAN 223

Appendix B: Guidance and Career Education Modules in PLAN 227

Appendix C: Science and Social Studies Curriculum Planning Charts 231

Appendix D: Sample Modules 245

Appendix E: Sample TLU's and Module Tests 253

Appendix F: Sample Programs of Study 263

I.

SYSTEMS FOR CAREER EDUCATION

INTRODUCTION

Our Invitational Conferences have for several years focused on the systems aspects of improving our vocational guidance capability in the United States. On the other hand, in January 1971, Commissioner of Education Sidney P. Marland sharpened up our need for career education in this country as it has not been sharpened before in several years. Commissioner Marland in an address reproduced here challenged the secondary school principals of the country to incorporate career education into their schools now, today. Career education in Marland's view will do away with general education and provide for the qualification of each secondary school student either to go on to higher education or into immediate employment upon completion of secondary school. In one pronouncement then, the Commissioner dared the country to see that each secondary school graduate had a salable skill upon graduation from high school.

The United States Office of Education was subsequently somewhat reorganized so that it can enunciate, support, and achieve the Commissioner's new goals in career education. I am happy that we have the Commissioner's principal architect of that change among us. I am also happy that we have architects of the Career Education Program's four Models--School-Based, Employer-Based, Home-Community Based and Residential--among us as well. We, therefore, have in this room several who have the opportunity and challenge to see that the United States soon enjoys a new career education capability.

What truly fascinates me about our Conference is that you of the new era of career education and those of us of the old era of career development here have an unprecedented opportunity to look at a new national goal along with some recently put together national means of satisfying a part of that goal, the career development part. Those of us who have worked for five years to construct a new cybernetic capability for career development welcome the opportunity to hear the new call for this capability. At the same time we welcome the opportunity to acquaint those of you whom our cybernetic capability can serve with 1) what that service can be and 2) how the union of the old and the new might be effected through consideration of new goals and developing means.

The Conference proceeds in a pattern now established by custom. It is divided into two days of activity. The first part of the first day will be devoted to

reports of two of the four Career Education Models. Those reports will be introduced by Commissioner Marland's paper and the remarks of Dr. Rue Harris of the U. S. Office of Education who is in charge of the Program. The Home-Based and Residential Models were too nebulous at the time of the Conference then to merit special consideration. The second part of the first day will be given to an intensive examination of relevant work of the host institution, as has been our custom. We at the American Institutes for Research will report in detail on three of our principal guidance activities, Project TALENT, Project PLAN, and the Comprehensive Career Guidance System (CCGS).

The second day will be divided between reports and discussion. In the first part, each of the projects represented in our membership will have opportunity to report on current developments. I remind us all that the publications indicated in the Preface provide prior record of the projects, particularly the volume Computer-Based Vocational Guidance Systems which was published under the editorship of Dr. Alice Scates. The reports in the present volume therefore are largely progress reports, not complete descriptions of projects.*

Finally, the second part of the second day will be devoted to discussion. Here is where we must struggle with how we put our work together to meet the emerging challenges of career education. The discussion has been somewhat organized by prior indications of interest which Dr. G. Brian Jones and I secured and tabulated. However, Jones and I both hope that you let the events of the prior day and a half influence our discussion rather than being limited by the preconceived topics. Lines of attack formulated out of immediate experience are ordinarily so much better than anticipatory ones.

---

* I should add that the following papers are to be read with the realization that the projects to which they refer may have changed and evolved since the time of our Conference. Career education is a new development with a high metabolic rate; changes occur rapidly. The papers presented here represent the state of the art in October 1971.

CAREER EDUCATION NOW

*Sidney P. Marland, Jr.**

The first attitude that school principals should change, I suggest, is our own. We must purge ourselves of academic snobbery. For education's most serious failing is its self-induced, voluntary fragmentation, the strong tendency of education's several parts to separate from one another, to divide the entire enterprise against itself. The most grievous example of these intramural class distinctions is, of course, the false dichotomy between things academic and things vocational. As a first step, I suggest we dispose of the term vocational education, and adopt the term career education. Every young person in school belongs in that category at some point, whether engaged in preparing to be a surgeon, a bricklayer, a mother, or a secretary.

How absurd to suggest that general knowledge for its own sake is somehow superior to useful knowledge. "Pedants sneer at an education that is useful," Alfred North Whitehead observed. "But if education is not useful," he went on to ask, "what is it?" The answer, of course, is that it is nothing. All education is career education, or should be. And all our efforts as educators must be bent on preparing students either to become properly, usefully employed immediately upon graduation from high school or to go on to further formal education. Anything else is dangerous nonsense. I propose that a universal goal of American education, starting now, be this: that every young person completing our school program at grade 12 be ready to enter higher education or to enter useful and rewarding employment.

Contrary to all logic and all expediency, we continue to treat vocational training as education's poor cousin. We are thereby perpetuating the social quarantine that it has been in since the days of the ancient Greeks, and, for all I know, before then. Since the original vocational fields were defined shortly before World War I as agriculture, industry, and homemaking, we have too often taught those skills grudgingly--dull courses in dull buildings for the benefit of what we all knew were young people somehow prejudged not fit for college as

---

*Sidney P. Marland, Jr., is U. S. Commissioner of Education, the Department of Health, Education, and Welfare. This article is an excerpt from an address at the 1971 Convention of the National Association of Secondary School Principals, Houston, Texas, January 23, 1971. It was printed in The Vocational Guidance Quarterly for March, 1972 (Vol. 20, No. 3, pp. 188-192), which has kindly given us permission to reprint it.

though college were something better for everyone. What a pity and how foolish, particularly for a country as dependent on her machines and her technology as America. The ancient Greeks could afford such snobbery at a time when a very short course would suffice to instruct a man how to imitate a beast of burden. We Americans might even have been able to afford it a half-century ago when a boy might observe the full range of his occupational expectations by walking beside his father at the time of plowing, by watching the farmers, blacksmiths, and tradesmen who did business in his hometown.

But how different things are today and how grave our need to reshape our system of education to meet the career demands of the astonishingly complex technological society we live in. When we talk of today's career development, we are not talking about blacksmithing. We are talking about the capacity of our people to sustain and accelerate the pace of progress in this country in every respect during a lifetime of learning. And nothing less.

The question seems to be fairly simple, if we have the courage and creativity to face it: Shall we persevere in the traditional practices that are obviously not properly equipping fully half or more of our young people or shall we immediately undertake the reformation of our entire secondary education in order to position it properly for maximum contribution to our individual and national life?

Educational Irrelevance

I think our choice is apparent. Certainly continued indecision and preservation of the status quo can only result in additional millions of young men and women leaving our high schools, with or without benefit of diploma, unfitted for employment, unable or unwilling to go on to college, and carrying away little more than an enduring distaste for education in any form, unskilled and unschooled. Indeed, if we are to ponder thoughtfully the growing charge of "irrelevance" in our schools and colleges, let us look sharply at the abomination known as general education.

Of those students currently in high school, only 3 out of 10 will go on to academic college-level work. One-third of those will drop out before getting a baccalaureate degree. That means that 8 out of 10 high school students should be getting occupational training of some sort. But only about two of those eight students are, in fact, getting such training. Consequently, half our high school students, a total of approximately 1,500,000 a year, are being offered what amounts

to irrelevant, general educational pap!

In pained puzzlement they toil at watered-down general algebra, they struggle to recollect the difference between adjectives and adverbs, and they juggle in their minds the atomic weight of potassium in noncollege science. The liberal arts and sciences of our traditional college-preparatory curriculum are indeed desirable for those who want them and can use them. But there must be desire and receptivity, and for millions of our children, we must concede, such knowledge is neither useful nor joyful. They do not love it for its own sake and they cannot sell it in the career marketplace. Small wonder so many drop out, not because they have failed, but because we have failed them. Who would not at the earliest convenient and legal moment leave an environment that is neither satisfying, entertaining, nor productive? We properly deplore the large numbers of young men and women who leave high school before graduation. But, in simple truth, for most of them dropping out is the most sensible elective they can choose. At least they can substitute the excitement of the street corner for the more obscure charms of general mathematics.

I want to state my clear conviction that a properly effective career education requires a new educational unity. It requires a breaking down of the barriers that divde our educational system into parochial enclaves. Our answer is that we must blend our curricula and our students into a single strong, secondary system. Let the academic preparation be balanced with the vocational or career program. Let one student take strength from another. And, for the future hope of education, let us end the divisive, snobbish, destructive distinctions in learning that do no service to the cause of knowledge, and do no honor to the name of American enterprise.

It is terribly important to teach a youngster the skills he needs to live, whether we call them academic or vocational, whether he intends to make his living with a wrench, or a slide rule, or folio editions of Shakespeare. But it is critically important to equip that youngster to live his life as a fulfilled human being. As Secretary Richardson said, "I remind you that this department of government more than anything else is concerned with humaneness."

A Plan for Career Development

True and complete reform of the high school, viewed as a major element of overall preparation for life, cannot be achieved until general education is

completely done away with in favor of contemporary career development in a comprehensive secondary education environment. This is our ultimate goal, and we realize that so sweeping a change cannot be accomplished overnight, involving as it does approximately 30 million students and billions of dollars in public funds. Until we can recommend a totally new system we believe an interim strategy can be developed entailing the following four major actions.

First, we are planning major improvements in the vocational education program of the Office of Education. This program, as you know, involves the expenditure of nearly $500 million annually and our intention is to make the administrative and programmatic changes that will enable the states to use this money to make their vocational education efforts more relevant to the needs of the young people who will spend their lives in careers in business and industry. We intend to give the states new leadership and technical support to enable them to move present programs away from disproportionate enrollments in low-demand occupations to those where national shortages exist and where future national needs will be high.

Right now state training programs fill only half the jobs available each year. The other half are filled by job seekers with no occupational job training of any kind. We do better in some fields than others, of course, particularly agriculture where we are able to come closer to meeting the total need because it is a relatively static job market with little growth projected. About 70 percent of the demand in farm jobs will be met with trained help this year compared with only about 38 percent in the health occupations and 35 percent in various technical fields. This is nice if you happen to own a farm, not so nice if you run a hospital or laboratory.

We obviously require greater emphasis on such new vocational fields as computer programmers and technicians, laser technicians, and jet mechanics. We particularly need qualified people in health occupations such as certified laboratory technologists, dental assistants, occupational therapists, and the like. And, of course, we badly need men and women to capably service the rapidly growing environmental industries. Though when we speak of new occupations it is always useful to remind ourselves that even some of the newest, such as computer programming, for example, will very likely be obsolete in 20 years or so, affirming once again the need for a sound educational base underlying <u>all</u> specific skill training.

Second--and here I refer to all cooperating agencies of education and government--we must provide far more flexible options for high school graduates to continue on to higher education or to enter the world of work rather than forever sustain the anachronism that a youngster must make his career choice at age 14. This necessitates our broadening today's relatively narrow vocational program into something approaching the true career education we would eventually hope to realize. Vocational students need much more than limited specific skills training if they are to go on to post-secondary education, whether at the community college or four-year level. And young people presently drifting in the general education wasteland need realistic exposure to the world of work, as well as to the option of general post-secondary schooling.

Third, we can effect substantial improvement in vocational education within current levels of expenditures by bringing people from business, industry, and organized labor, who know where the career opportunities are going to be and what the real world of work is like, into far closer collaboration with the schools. Eventually, further subsidies or other encouragement to industry to increase cooperative education and work-study could greatly enhance these programs. Efforts should be made by people in educational institutions offering occupational courses to get nearby employers to help in the training. This will aid not only the students but employers as well by providing these cooperating firms a ready supply of skilled workers well prepared for the specific demands of their particular fields. I would add only this caveat: that these work experience arrangements be accepted and operated as genuine educational opportunities of a laboratory nature, not simply as a source of cheap help for the business and pocket money for the students. Youngsters should be given the opportunity to explore 8, 10, a dozen occupations before choosing the one pursued in depth, consistent with the individual's ambitions, skills, and interests.

Fourth, we must build at all levels--federal, state, and local--a new leadership and a new commitment to the concept of a career education system. For we require leaders willing to move our schools into more direct and closer relationships with society's problems, opportunities, and ever-changing needs. I believe these leaders will come primarily from the ranks of organizations such as this organization. Not only will the present vocational-technical education leaders be partners in change, but general educators, long dedicated to the old ways, must become new champions of the career program.

PLAN FOR CAREER EDUCATION

*Rue W. Harris**

I bring you greetings from Commissioner Marland, and from Deputy Commissioner Davies, of the U. S. Office of Education. Your statement, Dr. Tiedeman, that now we are all interested in career education because of the Commissioner's interest, I hope is not too much akin to the story about the new employee who, when taken to the boss by one of the old hands, was told, "Come on in and meet the boss. You'll love him. That's a rule."

The Career Education Development Program, which is handling OE's four models, is under a task force called the Career Education Development Task Force. Organizationally, I am Special Assistant to the Deputy Commissioner for Development, acting as director of this task force.

There are some things that I would like to discuss with you about the career education development program. I will not talk about the four models in any detailed way, because each of them will be presented in detail as the Conference moves on.

What is career education? This is not a question that can have a full and complete answer right now, because even as Commissioner Marland himself states, it is something that is still growing and shaping and evolving. He indicates that it's something that we can talk rather glibly about, but we experience difficulty with it when required to give operational definitions that are meaningful and, at least to some extent, unassailable. Fortunately, there is a review committee of educators, businessmen, and others who will meet periodically over the next year or two to try to prepare a defensible and complete definition of career education from philosophical, conceptual and operational points of view. I'll therefore leave exact specification to the review committee.

This morning I merely want to bring out some of my own concerns. I must indicate, by way of background, that I've only been in the career education area for about one month. Today also marks only my fourth "monthiversary" with the U. S. Office of Education itself.

**Rue W. Harris is Special Assistant to the Deputy Commissioner for Development, and Director of the Career Education Development Task Force, U. S. Office of Education.*

Let me talk a little bit about the problems that I currently see and want to mention in regard to some of the career education models. These are only the ones I see and want to mention specifically; I know that there are many others with which all of you are concerned and they will be brought out in the later discussions about each of the models.

School-Based Model

First, in my experience as a teacher, my fellow teachers wanted their subjects, their disciplines, their areas of interest, to be made "real," "important," and "good" to the students. I have no quarrel with this! I do quarrel with the fact that the teachers did this many times by deprecating other areas. Rather than just tooting their own horns, they also had to throw rocks at the others. As the math teacher says, "It don't make no difference if you don't know English, you know. Here's where it is." And if this is a problem that we really must put up with, I think that all the curriculum materials in the world are not going to make career education succeed in a comprehensive way.

Second, we talk about exposing the young people to the world of work, to the concept of being part of a work-oriented society. In my experience (again I have to limit it to that) not one teacher in 20 ever has been in the "world of work." And I say that, not because teaching is not work, but it's a special kind of work world. It's clearly an academic world to most teachers. And I'm not sure that they have the kind of affect or feelings that can transmit world-of-work meaning clearly to the students. In some major way it is also a problem with most guidance people. Most of them who have been working in the area of guidance understand career development and career ladders (outside of the educational academic track) only to a very limited extent.

A third kind of concern that I have, along with some of my economist friends, is the impact of an additional work force on our economy and society if many youth, who in the past were going to college for several years, finally realize it is not necessary. I believe that will be a tough problem in a national sense. We have to be very careful how we prepare these young people to go immediately into the world of work shortly after they leave the 10th, 11th, 12th, 13th, or 14th grades.

I believe, fourthly, that talking about the school-based model as a "model" can give the impression that it is "the" answer that is to be replicated by the hundreds, if not by the thousands, throughout the country without too much concern

for the local community, for the needs of the area, and so forth. We perhaps could better call the school-based model a school-based project. Its form can really vary in tremendous ways from school district to school district.

The fifth thing is the whole notion of career education as it relates to vocational-technical education. There is no doubt in my mind, or in the mind of the Commissioner or in the minds of many of the people around the Office of Education and elsewhere, that vocational-technical education does, in fact, provide one cornerstone for career education. But I don't see, for example, very many people from the arts and humanities approaching the problem, trying to figure out by their own initiative where they fit. The traditional academic disciplines seem to me to be insufficiently represented in thinking about, planning for, and integrating their thoughts with, the career education movement.

Employer-Based Model

In the employer-based model, other problems exist. I think we have to be very realistic about what we can evolve in this so-called Model II. We don't really have a tremendously clear notion of how all the aspects of an employer-based program will work. This will be addressed later today.

We'd be in a terrible position if we started an employer-based model where we were trying to help kids be "truant" at the age of 14. We must work out ways in which the employer groups can operate legally prior to there being any change in statutes, which isn't going to occur in the next few months. And then there are all the problems of child labor laws, and insurance that will have to be carried for people who are not really full-time employees.

There is also the problem of incentives for the employer. If the incentives are similar to the ones that have been used in the past, the programs will be rather specifically oriented toward the training of individuals to go directly into a specific job in the company. I'm concerned in the employer-based model that we have participation, on-line participation, by the young people in a variety, or a cluster, if you will, of experiences that are career related, not merely training in a particular skill or skill group. If the person has an interest in the total health area, perhaps we should see that he gets involved in a realistic way with health insurance companies, drug firms, drug manufacturers, hospitals, doctors' offices, technicians' work, laboratory work, and a number of things that make up the larger cluster of what one might call the health business.

I've been in the world of work for some period of time (external to the

educational community) and I find that many times the training department of a particular company has no more connection with the on-line work experience than the public schools have. The vice president for manufacturing is frequently at swords' points with the director of personnel and training to "keep those people out of there until they're ready." And I think that this is a problem that we must deal with.

Another concern is how we get the whole notion of self-realization--the human values, the cultural experiences and growth, the basic skills that are supportive of many of the operating work skills--infused into a program that is completely employer-based. Maybe it is not realistic to assume that we can do it completely, in the employer-based area, but I think that's where we have decided to start; that's where we want to look. It is an R&D project. If we don't stub our toe anyplace, then probably we haven't stretched far enough.

Home Community-Based Model

Now to the home community-based model. I woke up early this morning and was able to catch some Sunrise Semester on TV. It was pretty interesting. Also I was able to catch a little bit of Hayakawa talking with a small group seminar in a class that he was conducting. I asked myself, "What is it that we want to do that's different from this?" Some people have referred to some of the things we might do in the home-based model as a Sesame Street for adults. (I'm not sure that that's a different Sesame Street than we have now.) That's a glib statement, but when you look at it a little bit, you get back to the question of what do we mean by career education and what is the target audience we can reach? You'll hear more about what some of the thoughts are that were developed by the Education Development Center, in particular, later on today. But if we just have more of the same, we don't really need an R&D program; it's been going on for years and we can find out pretty much how it works, and where the weaknesses are and so on. Then we just add to that some kind of home-learning, like correspondence school! We've done that for years, too. We talk about guidance and placement in the community. Certainly the Department of Labor and local employment offices have been doing a lot of that! It seems to me that our real job may be to take existing mechanisms and paste them together so that they work in a more articulated, more effective, more efficient, and perhaps more directed fashion. I'm not defining this as the Model III program, but it's one possibility.

If we try to go into skills training we have a problem because the cost per

person to produce those kinds of television shows, for any one particular area, is perhaps prohibitive for the number of people that would be a real target audience. Perhaps what we want to do is look at other ways in which one negotiates his way through life, perhaps changing occupations. How does he develop himself in a way that allows him to have more confidence to attack new and different kinds of job opportunities, and so on. Again, we have to worry about how much is more of the same and how much is something new, and what does the something new mean and how much does it cost? And how do we define audiences?

We have also the labor force considerations. All I need now is to have my wife start watching our Sesame Street for adults and say, "Hey, I want to go out there in that world of work." From an economic point of view, a real consideration is: what if in the next two years we add five million more people to the work force? Without any value judgments on anyone's part, it is a real economic question.

Residential Model

In the residential model, we have 2 or 3 problems with which we must deal. What can we do about the variability of offerings? Let's say we bring in 500 families. Now we've built a community of perhaps 2000 people (which is bigger than most of the communities in the 6 states of Model IV--Idaho, Montana, North and South Dakota, Wyoming, and Nebraska). There are a number of small communities, and the residential model will try to take people out of these small communities and place them in sufficiently large size groups so that it can be economically feasible to provide hands-on training. How do you put together 2000 people and have them become a community--with all the kinds of things that go on in a community of 2000 people? And how much variability of the offerings can you really afford? How many different things can you have? Also you've got the problem not unlike some of the school districts near military bases with kids constantly coming in and going out of school. How do you do the job with the children of the families where the head of the household (and others) are in a career development program? Remember, they may only be there 3 months, 6 months, 12 months, or so; they're not going to be there for 4 years.

Overall Considerations

Those are the kinds of concerns that I have for the four models. I do not think of them as being easy to untangle. Perhaps they're easier than I think; perhaps they're more difficult than I think. But there are a few things that I want to mention now that cut across career education in its entirety.

One is comprehensiveness. It is the concept of those of us in OE who are working in career education that it is a comprehensive and integrated approach. It includes self-development or self-actualization, as well as the exploration of work areas, career paths (including lawyer, businessman, painter or handyman) so that one can be retrained as a physician or something else. Career education is comprehensive; it isn't a part of a program. If there's anything central to our notion, it is the fact that career education isn't one thing, academic education another, cultural growth another, etc. Only a little bit with tongue in cheek, let me say that if we hadn't loused up the term "education" by what we've done with so many of the students who have had what I will call "education for nothing," we wouldn't have to have the term "career education," which is "education for something." Now, while I say that partly with tongue in cheek, I believe, again from only limited experience, that counseling and guidance continue to fall short of the comprehensive, inclusive, extensive kind of effort that would be good (to use a value word) for each child. I maintain that most children get more ideas about where they're going to go and what they're going to do from some "star" in their sociometric group of teachers and parents than from what they learn in any factual, rational, thoughtful way through guidance and counseling.

In all of these models, perhaps more in II, III, and IV, the employer-based, home-based, and residential, I am very much concerned about the way that the approach gets integrated with all of the agencies and activities that are already on-going that can be part of this program. There must be literally dozens of activities outside of those that the Office of Education and their cohorts are doing, that would be valuable factors in the growth, career development and self-realization for a given individual. How do we get the Department of Labor, for example, involved? Or, to come the other way around, how do we get involved with them and all the other programs that go on so that there is something an individual can rely upon without having to make a new start and meet a different thing every place he goes? It's kind of like trying to get visas; it is unbelievable the different sets of rules and processes--but they are all for visas. It's not a good simile, and I'm not representing it as one. But I get

the same feeling, even when I deal with a single agency of government; it's as if every part is unconnected.

One more thing that cuts across all the models. I will assert that education is not a determiner of employment. It is a determiner of an individual's employability, and I think we have to keep these notions together in our heads, but they're separate as entities. There are national policies and ways things move more massive than any of us can imagine, that affect employment. And I don't think there's a whole lot, frankly, that we can do in education to affect it. Maybe we can, but I don't know that there is. But I think there is something that we can do in one case after the next about the employability of particular individuals. That we intend to do in the Career Education Development Program.

SCHOOL-BASED MODEL

*Aaron J. Miller**

In introduction, John Odgers and I are pleased to share with you some of our thinking, some of what we feel is progress and some of the work we've done to date related to the school-based comprehensive career education model. We are tremendously enthusiastic about this project for a number of reasons. First, it provides an opportunity to make some immediate impact on the life of youngsters in our school system. The stringent time frame of the project forces us to move ahead promptly without the luxury of some two, three, or four years of planning and development, and then pilot testing at an even later date. Instead, the time frame forces us into immediate action in development, testing at the same time, and installation of the model for trial in September of 1972. Our feet are to the fire in meeting this deadline.

Second, the model requires collaboration with the local districts that we're working with as development test sites. In working with each community, we share its rich store of human and other resources in the development and testing of the model to that extent permitted us.

In presenting our ideas about the school-based model, I need some definition of career education. I know Rue Harris said that defining career education is like defining "love;" everyone who talks about it defines it differently. But nonetheless I'd like to present several perspectives of career education. As Dr. Harris indicated, career education is a comprehensive system in that it progresses from early childhood into adult years and it involves all of the students. Comprehensive career education is not for some students, it's for every youngster regardless of his post-secondary school plans. Career education involves the entire school program and the resources of the community. It unites the student, his parents, the schools, the community, and employers into a cooperative educational venture. It provides the student with information and experiences representing the world of work, and it supports the student from initial career awareness to career exploration, and on to a career direction setting, career preparation, and

---

**Aaron J. Miller is Coordinator of Field Services and Special Projects at the Center for Vocational and Technical Education, Ohio State University.*

career placement with follow-up or follow-through including re-education or moving back into the system at some later date if necessary.

Conceptually, think of this engineering analogy: a rigid metal bar can take some stress but, when individual strands of steel are woven into a cable with the same diameter as the bar, the breaking strength is greatly increased. What we have in mind for the career development program is somewhat analogous. Where the existing offerings have heretofore appeared as individual strands, we want to weave them into a total theme, career development being the theme. This may not be an exact analogy, but it illustrates the way in which the new system will, through weaving together of now disparate strands, gain strength as well as a flexibility that the old iron bar did not have.

Keep this in mind for a minute as I talk a little more about some of the elements of career education. If we look at some of the elements--and these aren't arranged in any kind of ordering in terms of progress from kindergarten to grade 12--we see these as essential elements as youngsters progress through these experiences in career education, the home and community life. That is, an entering student has some knowledge, and attitudes toward himself, what kind of person he is, what he hopes to become. We'll call that self-awareness. Now, through career education in his home, and community experience, we want him to become involved in a planned sequential process of self-assessment and self-evaluation which will result in enlarged awareness of his self-identity. That is, we want him to know well who he is and what he's like, and to develop a reasonably consistent internalized value system as enhanced by a self-image of fulfilled potential.

Now to career awareness itself. The individual in elementary school already possesses some knowledge about and attitudes toward some careers. He knows something about career performance, associated life styles, rewards, leisure time. Let's call that knowledge of careers "career awareness." Then through career education, the home, community life, we want to assist him in understanding the broad range of careers that are available, not only as they serve him and the community, but society at large. Then we want him to experience active career exploration which leads to career identity. We define career identity, then, as the individual's selection of a role or roles within the world of work.

Next, appreciations and attitudes. This was included as a means of focusing some attention on the effective component of career education. Through career education's supporting systems, the individual should develop an internalized

value system which includes a valuing of his own career role and the roles assumed by others. These appreciations and positive attitudes toward his own career role and the roles assumed by others in society should lead to an active and satisfying participation as a productive citizen, and thus provide a living and self and social fulfillment. So this area, then, of self/social fulfillment is defined as the internalization of a value system which motivates the individual as a self-actualized, self-fulfilling member of the world of work with appreciations for his own role and the roles of others engaged in legitimate productive work that is socially useful.

Then, economic awareness. All youngsters have observed or participated in the economic system; they've received an allowance; they know how to spend this allowance, and ask for more; they have some feel for the economy. Economic understanding, then, we define as the conceptual elements and networks which make it possible for the child or adult to feel--have a gut feeling--for the economy as it relates to him and his life needs.

Next, tool and process applications. If this was a roomful of vocational educators, I'd call it skill awareness and beginning competence. But with this particular group, in your perspective, perhaps tool and process applications will be acceptable. We've learned in our initial work with the comprehensive career education model that there are certain terms that incite certain groups to riot--that there are certain terms that are acceptable to some people, unacceptable to others.

The entering student, then, is able to participate in some tool and process applications. And we'll define these tool skills very broadly, to include all of the ways in which man extends his behavior--that is, he extends his ideas by language skills, by drawings, crafts, performance, etc., and he extends his ideas over space and time by the use of written communication, the telephone, paintings, photography, building devices and materials. He extends his senses through the use of tools and microscopes, things of this nature. Then, man engages in process applications by creating or imitating individual or group sequences or tasks--as when he learns to change spark plugs in a car by observing, imitating someone changing spark plugs.

Then, employment skills. Additionally, this development will feed into other elements of career education, in other words, career identity, economic understanding, life support, etc.

Decision-making. The entering student has some understanding of the decision-making process and some decision-making skills. If he's able to understand cause-and-effect relationships, he's ready to examine the decision-making process. Through the supporting school and life experiences of career education, he'll develop increasing skill and experience in a rational process of decision-making and practice making decisions, coming to accept the responsibility for the outcomes of his decisions. The career decisions made as he progresses in the Comprehensive Career Education Program will move from very tentative flexible career decisions to decisions which are increasingly irreversible, or reversible only at some cost of time, effort, or money, so that he should reach a decision which represents a career's direction setting by around grade 10 (notice I say career's direction setting, not a specific career), or at least early enough to provide for the development of an entry level skill and a career plan prior to school exit.

We define career decisions, then, as career direction setting, the process of rational planning for immediate, intermediate, and long-term career development.

Employment skills we're defining as elements of career education which have to do with searching for, locating, and obtaining employment, both on an initial and an advanced basis, with a distinction being offered between employability skills and employment skills. Employability skills are the tool-process kinds of skills. Employment skills are those skills necessary to find and hold a job.

Then, we think educational awareness is a key element of this model. That is, the student has some awareness of the relationship between education and training, whether formally or informally experienced, and the life roles assumed by self and others. It is from this educational awareness that the student must continue to develop and refine his understanding of his own education and training in relation to the real world and changing world in which he's going to work. He'll also come to recognize the need for specific education and training for specific career roles. Educational identity, then, combines an understanding of this relationship between education and training for life roles, and understanding his own style, pace, capabilities, and capacities. Educational identity is the ability to select and evaluate educational avenues for the development of the student's career plan.

These, then, will be the general elements of a career education.

In the development of Model I, or the School-Based Comprehensive Career Education Model, we're using these basic elements to further define the program.

That is, if we array these in terms of a matrix, we would use these elements along one axis; developmental levels, which might be expressed in grades K-12 on another axis; and complete this matrix with desirable student behaviors, expressed in performance criteria for their measurement along with alternative treatments or curriculum strategies for achieving those behaviors. This further development is still in process at the present time; I therefore can't offer you the completed matrix.

I can, however, present a method by which such a model might be implemented in a school system. But remember, this is still only an example of how this might take place. In the early years, it might be appropriate to stress career awareness. This might be done by any number of methods; one method which seems to be a viable strategy is the use of career clusters, e.g., construction occupations. Teaching about the career clusters could be incorporated into the curriculum in the early grades. Then, intensive counseling and guidance would take place somewhere in grades 5, 6, and 7, in which a youngster assesses what he's interested in and what his capabilities are in terms of certain career clusters, thereby moving to make some choice about sampling in a career exploration mode in the middle school years, say grades 7-8-9, or 7-8-9-10. But this career exploration would be a sampling of various kinds of career clusters--the purpose merely being familiarization with career alternatives. Then sometime a little later, grades 8-9-10 say, we would introduce another intensive time of counseling and guidance, where a youngster would then have opportunity to think and talk about his abilities, aptitudes, interests and direction-setting decisions in a career in relation to his prior explorations. This, then, might lead him into a program preparing him for specific employment on leaving grade 12, or for post-secondary programs, either vocational-technical institutes or the college or university. But none of these programs can be mutually exclusive. They have to be going on somewhat concurrently with the emphases being shifted from time to time.

The first time we presented our sketch, we had sharp lines drawn at the various levels. But we didn't mean them to imply that these are discrete problems which students have to consider once and for all, that they are locked into these decisions. What we mean to suggest is that these transitions take place in planned ways, that they take place in several different decisions, but that all problems exist in potential at all transitions.

Another point I want to make about this sketch is that the counseling and

guidance component is infused throughout the system--that it's very subtly infused throughout the system. There are points where certain things need to happen, certain developmental levels where youngsters need to begin to make critical choices and decisions. But it's not a series of high-profile units or blocks that take place here and here and here. In other words, it's infused throughout the system.

A component we particularly envisage for the school-based model is that of placement. The school has the responsibility for placement--100 percent placement, in jobs, or in non-baccalaureate post-secondary programs, or the college or university. Now, I guess the question arises: do you really mean 100 percent placement? Well, the goal must be 100 percent placement. True, there may be certain cases where this will not be achieved, but the point is that the schools are accountable for the youngsters that go through the system and exit from it. Schools are therefore responsible for placing their students in the next educational component of their choice or in gainful employment.

Another point I'd like to make relative to a school-based model is that it's a total system of education, a total experience, a total way of life, in that certain things happen across all grades where a student develops self-awareness and understanding of his interests and abilities; that this doesn't happen in a discrete curriculum unit in grade 5, or grade 7, or grade 9; that this is built into the curriculum all the way through so that the student continually develops positive attitudes about the personal, social, and economic significance of work; that there's not a curriculum unit on developing attitudes, so that by the last semester of grade 8 we say that this youngster has been exposed to this treatment or this curriculum unit, and when he comes out he will have developed the proper attitude toward the personal and social significance of work. I'm talking about a comprehended experience, not a mere set of actions upon students.

However, I think it is reasonable to expect that certain things ought to happen at certain developmental levels. That is, (1) that occupational awareness might most naturally take place in the early school years, and that this might happen by consideration of a series of clusters representing the entire world of work; (2) that somewhere around grades 7 and 8 is a time of broad exploration; (3) that grades 9 and 10 are times of more selective exploration based upon earlier experiences in 7 and 8; and (4) that the youngster has made career direction-setting choices by grades 11 and 12 in preparing for work in at least one specific occupational cluster or preparing for the next educational step.

Now, how might all this take place? Well, let's take some possible occupational clusters such as construction occupations, manufacturing, transportation, etc. In grades 7 and 8 a youngster might take 5, 6, 7, or 8 exploration experiences in clusters. His explorations would be based on his expressed interests, his aptitudes, and very careful counseling and guidance. Then after experiencing several such explorations, he might find one cluster that really turns him on. He says, "I like this. I'd like to explore this in greater depth." So he might actually then explore this in greater depth at the next grade level or developmental level. Then by grade 11 or 12, if this interest persists and becomes based with confidence upon his abilities, his aptitudes, he says, "Yes, I want to pursue this career cluster, either going to work after high school in some specific incremental skill training, or preparing for a post-secondary technical institute. I want to be an electronics technician, or I want to be an aerospace engineer that pursues this particular cluster."

Of course, what will probably happen is not quite so neat. After sampling six or eight clusters, at the first level, a youngster might say, "These are a lot of fun, but now I want to try something else." So he tries several more at the next level, and he says, "Gee, these were a lot of fun too, but I really don't like any of these and I want to try something else." So it's a series of complete sampling with no specific continuity. That's fine, our proposed system will accommodate this. The youngster still exits the system with the information he needs for rational career planning and career direction-setting, and he's a better person for having sampled several possibilities along the way. Aware explorations lend more meaning to the other courses that he's taken, while the system still insures that he's prepared and exiting with entry-level skills for going into the world of work, or for the next educational step, provided he lights on one possibility before leaving school.

I'd like now to bring you up to date and tell you where we are in the development of this model. We at the Center signed a contract with the Office of Education, effective the 15th of June, 1971, and we began work on the Model. Immediately following the signing of the contract, there was selection of a number of local education agencies (LEA's) or local school districts which will work with the Center in development of the School-Based Model. Through a careful screening process conducted by the Office of Education, six local education agencies were selected. These districts are: Pontiac, Michigan; Jefferson County, Colorado; Los Angeles, California; Mesa, Arizona; Atlanta, Georgia; and Hackensack, New Jersey. These constitute a wide variety of school districts.

In some cases we'll be working with the entire district--the entire district of Pontiac, which is about 24,000 enrollments; the entire district of Mesa, which I believe is about 25,000; and the entire district of Hackensack, which has about 4,000 students. In other cases we'll be working with: one administrative area of Jefferson County, Colorado, which enrolls about 5,000 students; one attendance area, the Belmont attendance area, of Los Angeles, which enrolls about 13,000 students; and one attendance area in Atlanta, of about 13,000 students. There is a great deal of diversity in these local districts. Clearly they're not randomly selected; they're specifically selected for that diversity. All were selected because of their commitment to career education. In the screening process, they said, "We're moving down this road. We're committed to career education and the installation of this kind of program in our school system. We're going to get there with or without you. But we can get there a lot quicker if you'll select us to work with you because we're committed to career education." So, clearly these are very desirable developmental sites.

In our initial conceptualization of how this project might unfold, the Office of Education and the Center believed that these six sites virtually had the model in place. The Center then expected to work with them, so that a little bit of money and effort and perhaps one or two new components of this model would bless the Commissioner's effort to start Model I in September of 1972. However, in visiting these sites we found that this assumption was not necessarily the case. From our perspective, these districts were actually well on the road, and they had excellent staffs, but there was no clear consensus among the seven of us as to what a career education model ought to be. Every system and the Center each had a different conceptualization. So we have started to work together and develop consensus of what this Model ought to be. Otherwise, the Model would have had no transportability once it was developed and tested.

Secondly, we found that while there were a number of operating components in place, most of them, while working, were not validated in the sense of having been developed upon student behaviors, performance criteria, and data definitely indicating that so and so works because students do in fact perform this way because of this treatment. By and large, most of the units were developed by teachers and the only real validity they had was teacher satisfaction. This does not mean that they're not good, it just simply means that there were no data to say that these were valid treatments to achieve the desired outcomes of a comprehensive career education model.

Both of these facts caused us to modify our strategy in the development of the School-Based Comprehensive Career Education Model. First, we felt it necessary to work with districts cooperatively in developing a conceptualization of the model, a matrix of activities, student performance, performance criteria, and alternative curriculum units or treatments for carrying out these strategies. We're presently doing this with the six school districts. Starting in late October 1971, we will have an inservice team of three people at each site, working with the LEA project staff, and further developing this matrix. Through a very carefully planned process we'll bring these suggestions together, eliminate semantic overlaps, and search for a conceptualization that can end up as our North Star, or guide, for developing the program.

Following upon that work will come the assessment or the validation of in-place units. We'll also be identifying other components or curriculum units elsewhere around the country for potential use in filling the cells of this matrix and gathering baseline data--student and community data--for later summative evaluation of the project. Then, upon identifying the gaps in the matrix, in terms of the program, we will assemble, develop, and test units with very limited development of our own. In general, we seek development based upon things that are already there that can merely be refined for use in the Model.

Finally, staff training will take place during the summer of 1972 and we presently plan to go into operation during the 1972 school year. A tall order but still a much needed one.

In summary, you can see that we have a very stringent time schedule. In this academic year, we must have coalesced, orchestrated, and brought the Model into being as units, instructional strategies, etc. by spring 1972. We start in September 1972. This means, then, that we're proceeding with deliberate speed, that we're afraid to look back because, as Satchel Paige says, "There might be something following us." We're not really sure we want to know what that is.

[This was followed by a question and answer period led by John Odgers.]

EMPLOYER BASED CAREER EDUCATION (EBCE)

*B. H. Banathy**

The Far West Laboratory for Educational Research and Development has a contractual arrangement with the Office of Education to study the feasibility of the Employer Based Career Education Model (EBCE) and to engage in some advanced design and pilot work if analysis indicates feasibility.

Our initial analysis indicated a requirement for four sequential involvements: (a) an exploratory analysis of the notion of EBCE; (b) in-depth feasibility studies in the various key areas of EBCE; (c) some advanced design work; and (d) pilot experimentation.

During phase one, and following the strategies of exploratory analysis, we have asked five questions:

1. Why career education in general and why EBCE in particular?
2. To what issues-problems-needs should EBCE respond?
3. What are desired outcomes of EBCE?
4. Given outcomes, what might EBCE look like (an initial image)?
5. What are issues and areas one should explore and study in assessing the feasibility of EBCE?

In response to the last question we have identified some 25 areas which indicated a requirement for in-depth study and analysis and we are now exploring these areas.

Seven of the areas relate to input studies and another six to the curriculum model. Eight studies focus on support systems and interface studies, and the rest on the identification of R&D requirements and R&D work.

Key Parameters of the EBCE Model

The Office of Education, in its early formulations of the EBCE concept, has provided some key parameters of the EBCE model around which to build. Essentially these are as follows:

EBCE is to be a comprehensive program of education merging the positive aspects of the existing school curriculum, academic, vocational and general.

**B. H. Banathy is a Program Director at the Far West Laboratory.*

The program should meet the individual learning needs of students.

EBCE will present a viable open-enrollment alternative to traditional schooling (but not a replacement).

The target population is a cross-section of youth ages 13 to 20.

EBCE will involve "employers" significantly and directly in the education of young people.

It will provide students with multiple work/learning experiences.

A unique feature of the program is that the major portion of students' learning experiences will take place in real-life, non-school settings.

Problems to be Addressed by Career Education

Our analysis indicates five problem domains, inadequacy of outcomes being the first.

1. Inadequacy of outcomes. An important criterion of formal education's ability to meet societal needs is the employability of its graduates.

The failure of young people to obtain employment upon termination of formal education is one of the fundamental problems facing education and the larger society.

While some of the factors contributing to high unemployment rates among young people are beyond the control of the educational system, an effective educational system can address some of the problems that inhibit young job seekers. We have identified five areas of concern related to outcomes. These are:

a. Lack of experience and lack of job skills. The kinds of work experiences which are available to most teen-agers cannot be included in a resume of job qualifications. Newspaper routes and gardening, etc. are not considered "real" work. These experiences are not assumed to endow the teen-ager with the kinds of attitudes and behaviors considered by employers to be appropriate to employees.

b. Lack of learning skills. This is the area where the schools' contribution to the employability of their students is most pertinent. It is found that public schools are unable to retain a significant proportion of their students until graduation.

c. Lack of occupational awareness. Schools today do not prepare youth to make an intelligent choice of the kind of occupation they wish to pursue. As a result, industry has inherited an increasing problem of turnover and high training expense.

d. Lack of socio-political participation. Another aspect of inadequacy of the output of the present formal system of education is its failure to prepare students for the part they might play in the social and political areas of life.

e. Lack of preparation for continuing personal development. A final aspect of major inadequacy of output is failure to prepare students for the time when this personal development will be their own responsibility rather than that of the home or school.

2. Relevance. Formal education does not relate adequately what goes on in the classroom and what happens to the student outside of school. The school does not directly address the real, immediate needs of adolescents: identity, purpose, value system development, peer-group relating, decision-making, and so forth.

3. Responsiveness. To survive, a system needs to respond to the changing requirements of its environment. Present-day schooling appears to be responding neither to student needs nor to societal needs.

Other aspects of responsiveness are accountability and cost-effectiveness. The current system of formal education does not have to account for its performance. (Emphasis has been upon the acceptance of students into the institutions of higher learning as a measure of school performance.)

Since schools have not been accountable for their performance, there has been little incentive to maximize the benefits per dollar spent on education.

4. Discontinuity. Our analysis revealed that a paramount problem is the discontinuity between formal education on the one hand, and occupational participation, socio-political activities and personal development on the other. The existing educational system does not adequately prepare people for these other spheres of human activity.

Students cannot be expected to innately possess the ability to communicate with, relate to, be tolerant of, and work effectively with diverse types of people (not just teachers, other students and their own parents). They must be provided the opportunity, through exposure to a wide variety of real-life situations, to develop the skills of social interaction. Students cannot be expected to become self-sufficient, self-directed, responsible individuals unless, again, they are exposed to real-life situations which enable them to develop a level of personal competence.

Students cannot be expected to make wise decisions about their lives, their life styles and their futures in general unless they are provided the opportunity

to learn about available alternatives, their requirements and consequences, and to develop the skills of decision-making and the acceptance of responsibility for directing their own lives.

5. The separation of educational domains. Another key problem is the separation of educational domains into academic training, vocational training and general education, and the division of those domains into subject matters. What is required, in essence, is an educational system which adequately restructures the domains of academic training, vocational preparation and general education, merging the positive aspects of each into a viable alternative to traditional education. Such a system would strive to provide each student with a means to select and pursue a life path which would support his aspirations and abilities. Every student would have the opportunity to develop the kinds of knowledge, understanding, and skills needed to live in a complex society. Such a model of education can be considered career education--education for life.

Outcomes to be Attained

Given the problems which career education might address, we have formulated outcomes expectations at two levels. At a broader level we have defined a set of EBCE goals and we have also stated educational goals relevant to the learner.

Goals of EBCE are as follows:

To provide an alternative to the existing general education and vocational programs for young people and adults who wish to achieve comprehensive career education.

To increase the relevance between education, the world of work, and life in general by adopting career competence as the central theme of the individual's experience within the educational system.

To integrate existing programs of general, academic and vocational education into a new educational experience.

To broaden the base of community participation in education by involving the business sector more directly and significantly in the process of preparing students for responsible careers, within the community and especially within the world of work.

To broaden the base of student participation in the educational process by progressively involving students in decision-making.

Career education aims to develop in the learner the following:

Self-Awareness. Each student needs to acquire knowledge and understanding of himself--his goals, abilities, interests and values--so as to be able to realistically plan and pursue his own life path.

Self-Sufficiency. Each student needs to develop the knowledge and skills necessary to proper physical maintenance (health and hygiene), effective management of personal finances and other resources, accepting responsibility for and functioning effectively in selected familial roles, and selecting and pursuing goals of personal development or fulfillment. Each student needs to develop the ability to gather information, analyze it critically, and make his own judgments and decisions based upon available information.

Social Skills. Each student needs to develop the skills required to effectively communicate with other persons, to develop understanding and tolerance of individual and group differences and values, and to work cooperatively and effectively with others in group endeavors.

Basic Cognitive Skills. Each student needs to develop skills of logical analysis as well as the ability to read, write and compute. These skills are essential to personal development, continued education or successful employment.

Career/Life Skills. Each student needs to be exposed to a broad range of occupational, avocational and leisure activities, so that he has the information and experience necessary to make rational career choices involving all these realms of endeavor. Each student needs to develop some minimal skills representative of vocational/avocational areas of interest to him as bases for further growth and development in his chosen pursuits.

Skills of Employability. Each student should be helped to develop basic skills essential to seeking, and acquiring, employment so that he may compete more effectively for available employment opportunities.

A Definition of Career and Career Education

The term career has many definitions, ranging from career as solely "an occupation or profession" to career as "one's progress through life" (Webster, 1968). We have elected to implement a broad definition of career which addresses the individual's total life; that is, his occupational, his social and personal concerns.

Career encompasses the selection of and advancement in a meaningful vocation within the world of work, the selection and pursuit of fulfilling avocational and leisure activities, and satisfying participation in the social and political processes of society.

Career education is conceived as education for one's progress through life. It is the aggregate of involvements by which an individual acquires and develops knowledge, attitudes, and skills to engage in meaningful vocational, avocational, leisure, social and personal pursuits. Career education enables the student to realistically assess and develop his own interests and potentials in view of the opportunities offered and constraints imposed by society.

There are two important implications of the notion of career:

Career is unique to a given individual. The prevailing practice of schooling today is to provide a generalized curriculum which is derived from stated educational goals. Attempts made to adjust curriculum to the individual learner--at best--cope only with differences in learning rate. Curriculum content, its context, and method of presentation are identical. On the other hand, as applied to education, the uniqueness notion of career will lead us to design curriculum around each and every individual learner.

Career is future oriented. Education today is past oriented. We provide for education in the past tense. The student is focused backward in coping with parts of the "accumulated knowledge." The content and context of education are taken from the past; its method of mass instruction was designed to cope with the requirements of the industrial revolution a century ago. Probably the most exciting dimension of designing a new educational alternative is the challenge to provide education in the future tense.

The Nature of an Emerging EBCE

One of the key dimensions in which the model to be designed becomes an alternative is that while existing schooling is built around classes of students, the EBCE model is to be designed around the individual learner. Today we select instructional programs and at best we individualize them. The content and the context of instruction is the same; its mode of presentation might be different to accommodate the individual. The EBCE model leads us to design individual education in which not only the mode but also the content and the context of the experience are tailor-made to fit the individual.

In designing the EBCE curriculum we are to:

Evolve a comprehensive career education--education for life--by structuring the educational experience around a central theme: life skills, vocational/avocational/leisure competencies.

Provide an educational program which integrates preparation for vocational and avocational pursuits with the academic curriculum.

Provide the student with multiple opportunities for obtaining relevant information concerning a wide variety of vocations--job requirements, work habits, working conditions, career ladders, etc.--needed for making rational career choices.

Provide opportunities for direct on-the-job work experiences that will serve to broaden the student's knowledge of occupational requirements, relate theoretical knowledge to practical application, and develop job skills. In addition, direct work experience will aid the student in developing the social competence required in the world of work, and in his relationship to society.

Develop specific cognitive skills: communication skills and quantitive reasoning as well as problem-solving and decision-making skills. EBCE will enable students to develop a positive self-image and value system to acquire self-sufficiency in maintenance of life and health, to develop social and group skills, and to build an information/knowledge base for rational decision-making.

Provide a relationship, clearly comprehensible by students, between academic curriculum and occupational skills, job choice, and a larger fulfillment in one's total life. One objective of EBCE will be to encourage the development of positive attitudes toward learning so that students perceive and accept the need for and desirability of continuing education, both formal and informal, for long-range vocational advancement and personal fulfillment.

Figure 1 depicts the four major curriculum domains of EBCE and their interrelationships.

Another key characteristic of our EBCE model is that learning is never context-free; it is provided within the functional context of real life situations. Life situations are vocational, avocational, leisure and other involvements which the learner may pursue and which, in an important way, provide situational frameworks of his learning experience. These situations are the functional contexts in which learning takes place relevant to the four competence domains (cognitive, social, personal and vocational/avocational/leisure). Life situations are here and now rather than something in the distant future for which we need to be prepared. The notion is that the best way to prepare for the future is to help the individual to acquire competencies which enable him to perform successfully in life situations now.

The educational experience projected in our model is performance based. The student will not be required to undergo an experience where he can already

Figure 1

PERSONAL COMPETENCE
· Information/Knowledge base
· Self-sufficiency
· Acquire uniqueness strength
· Become self-actualizing
Within the functional context of
Interactive
SELECTED CAREER/LIFE COMPETENCES
Vocational/Avocational/Leisure
· Information/orientation
· Exploration
· Representative skills
· Skills and attitudes of employability
· Entry level skills
Within the functional context of
REPRESENTATIVE CAREER/ LIFE SITUATIONS
Multiple Vocational/Avocational/ Leisure/Personal/Activities
(Individual & Group Activities)
Interactive
Within the functional context of
SOCIAL COMPETENCE
Skills and attitudes relevant to effective group membership-leadership behaviors
Interactive
COGNITIVE COMPETENCE
Cognitive skills and cognitive heuristics
Within the functional context of
Interactive

demonstrate competence and he will be allowed to move on whenever he has acquired the desired skill or knowledge.

Another set of characteristics relate to a cluster of terms focused around the learner. Learning-focused refers to the placement of emphasis on the learning task rather than the teaching task. Arrangements are made in the learner's environment to enhance his mastery of the learning task. Learner-active describes a process in which the individual is actively and intensively involved in learning experiences, and a staff is involved in managing the learning environment to facilitate the success of the learner. A learner-directed program is: self-paced (learning not bound by time period); self-selected (learner selects own content); self-initiated (learner initiates own involvement); and self-evaluated and self-adjusting (learner progressively assumes higher degree of responsibility).

Responsive learning environments. The resource boundaries of the conventional school are set around the physical plant with only occasional excursions allowed beyond the boundaries of the plant. A student of a typical high school can legitimately spend all his school time within the physical boundaries of the school. In our model no such boundaries exist. The resources available to the learner are those of the larger community. New territories for learning will be identified, and developed; and new learning environments created by which to facilitate the attainment of learning tasks.

The employer-based notion. Employers are people or organizations who employ other people in profit-making, governmental, and other not-for-profit enterprises. They include large industrial firms like Shell Oil, small businesses like a family hardware store, government or quasi-government operations like the postal service, and public, non-profit agencies like the American Red Cross.

Whether a given career education model is employer-based, school-based, or other-based depends primarily on who sets policy and has fiscal control. EBCE is employer-based in that employers as a group will play a dominant role in deciding on educational goals and in mobilizing and allocating resources to achieve those goals.

EBCE governance. The governance of schooling today is usually in the hands of a single agency, the school board. The governance of the employer-based model is conceptualized as a partnership of a variety of interests and involvements. Public and private employers, community agencies, the education sector, parents and students constitute a new alliance and would share power in establishing and governing this new type of educational involvement.

Summary

An EBCE model is emerging within set parameters in response to the problem areas outlined, and for the purpose of attaining outcomes specific to EBCE. This model projects a novel organization of an educational experience, and a new configuration of innovative educational approaches.

ANOTHER EMPLOYER-BASED MODEL

Donald Swicord and Dean Des Roches**

Wiles and Patterson said, "The American high school must provide education for all the youth in the community assigned to it through the legal authority of that community." They failed to note that historically, vocational education, as part of the present high school program, has been the dumping grounds for many of our youth. Most vocational education programs have been developed by administrators on some quasi-analytic basis that boils down to offering a space to accommodate those who are not college-bound. Based on the premise that generally it is the function of higher education or other training institutions rather than secondary schools to prepare students for jobs, the curriculum and emphasis of most secondary school systems has given priority to preparing students for higher education. The rationale for the American emphasis on general education in secondary schools is that the versatility and adaptability required to compete in the complicated American labor market derives largely from general education in the sciences, mathematics, languages, literature, art, social sciences, and so forth. This has been recently attacked by Sidney Marland (1971).

> The ultimate test of our educational process, on any level, is how close it comes to preparing our people to be alive, and active with their hearts and their minds, and for many, their hands as well. True and complete reform of the high school, viewed as a major element of overall preparation for life, cannot be achieved until general education is completely done away with in favor of contemporary career development in a comprehensive secondary education environment.

The concept of career education recently introduced by such eminent educators as Dr. Marland might be sound impetus to the reversal of a bad trend. If we, as educators, truly believe in what we continue to espouse, that is, the challenge of change, then this becomes our responsibility. It is demanded of those who perceive themselves as agents of change within education--the Ivan Ilyich's have too long espoused great theoretical concepts without offering pragmatic vehicles for implementation.

**Donald Swicord was Component Director, Administrative Services at Research for Better Schools, Inc.*

**Dean Des Roches was Component Director, Learning Services at Research for Better Schools, Inc.*

We will now review some of the reasons for the development of something called a Model 2, EBCE--Employer-Based Career Education Program. Of all the people who have written about adolescents, probably four of the giants are Erik Erikson, Charlotte Buhler, Robert Havighurst, and Margaret Mead, who have pointed out that the years between 13 and 18, the so-called teen years, are absolutely critical in the development of the mature adult. In many other cultures, most of them primitive, this period between childhood and adulthood is a time of transition, to be marked by one of the "rites of passage." In most of these cultures this transition occurs within a day, within a dance, within a trial by fire or some other ordeal. As a rule, it seldom lasts more then three weeks: in our civilization the time of passage would occur between the ages of 13 to 21.

Frank Parsons, who is generally acknowledged to have been the founder of the vocational guidance movement in this country, had to set up his Vocational Bureau in Boston without any theoretical support at all. At that time, very few regarded the choice of an occupation as a problem which deserved the close attention of either practical humanitarians or of serious scholars. His book, Choosing a Vocation stated, "People need to study themselves closely, and also to become familiar with the conditions and requirements of a wide variety of jobs, and should then arrive at a close match between self and job by the employment of true reasoning." Perhaps Model 2 should have started back there in 1909 with Parsons.

During the years between 1910 and 1950 it was hoped that it would become possible to measure both client and occupational characteristics with increasingly fine precision so that eventually it would be possible to test the client and tell him what jobs to consider. But the assumptions upon which most vocational guidance procedures rested were the same as those which Parsons had made, and test development never reached the pinnacle he had hoped.

By the end of World War II, another influence was Carl Rogers' refutation of the notion that most clients could quickly bring true reason to bear upon their vocational problems and that counselors were experts who could readily solve these problems by using their superior knowledge and techniques. This was seen to be completely inadequate in light of Rogers' writings. Vocational counselors tried to allow more time for clients to work through the difficulties of searching for an occupation and they became more aware that facts do not always

speak for themselves. Vocational guidance workers rather eagerly grasped at Rogers' techniques without inquiring too closely into their appropriateness for their own specific purposes.

During the last 20 years, however, there has been a substantial increase in the amount of research in the psychology of occupational choice, which has included a number of sustained research programs in this area, such as those by John Holland. These have led to several important theories, i.e., the work of Eli Ginsberg and his associates, of Anne Roe, and of Donald Super. Largely because of the writings of these theorists, it is now widely recognized that we need to think in terms of vocational or, more properly, career development. However, the practice of vocational guidance is very similar to what it was in Parsons' day. There have been changes in vocational guidance, but the impact to the purpose of meeting learner needs has been minimal and mostly in techniques while the theory behind these techniques remains substantially the matching one foreshadowed by Parsons.

Let us consider another catalyst for change--manpower programs. Youth manpower programs are seen in terms of job placement activities, reduction in proportion below the poverty level, and impact on the Gross National Product. Although such programs theoretically are applicable to all segments of the society, in practice they are focused on the needs of disadvantaged young adults. Manpower programs, according to the U.S. Department of Labor, are ways of bringing together job seekers and the job. They include a variety of approaches carried out by vocational rehabilitation, the Manpower Administration, law enforcement administration personnel, and other governmental agencies.

Economists think of the importance of the manpower program in terms of reducing unemployment, raising poverty income level, enhancing labor force entry, and increasing the Gross National Product. From a psychological point of view, manpower programs are all based on the central role of the work as a medium of behavioral change. In 1968, the Manpower Report of the President said,

> In the early 60's the emphasis was upon first approach, through programs which aim at motivating workers, and which stress pre-vocational activities and training in attitudes and social skills. More recently, however, emphasis has been shifted to getting workers into jobs based on the theory that real-life situations were those most likely to affect attitude. The aim is to provide a setting in which a disadvantaged individual can perform adequately--he cannot perform adequately without a fully developed work identity--and can then move in the direction of strengthening that identity.

Vocational education has received some federal aid since 1917. However, it has generally tended to be viewed as the alternative for those youth not expected to succeed in general education. In 1968, the National Advisory Council on Vocational Education described the de facto situation by stating that more than half of the students still are being trained in fields of agriculture and home economics, although the employment opportunities in the former are dwindling and in the latter are primarily nonremunerative. The job search process is highly unstructured in the U.S. with reliance primarily on locating jobs by informal means. In addition, most youth enter the labor market with little information about the world of work or about the relation between various occupations and their knowledge and job requirements.

In the 60's, the U.S. for the first time in its history embarked on active youth manpower policies. These were directed primarily at the disadvantaged. The policies reflected, as does most public policy in the U.S., a consensus that federal intervention, as distinct from state and local programs, is necessary when unsolved problems begin to affect the national interest. Except for the public youth employment projects of the Depression years, the only previous federal government approach to youth and jobs had been the child labor laws, which were directed at keeping young people out of the labor market. Thus, in the early 60's, the response to the higher youth unemployment rate, as reflected by the official government policy, was relatively narrow--a total employment economy, a high school diploma, and occupational training.

During the 1960's, while manpower personnel were evolving new policies, educators were developing attitudes of self-consciousness and paranoia. There was a great emphasis placed on the evaluation of public schools by educators, theoreticians, and submarine builders. During this time, opponents and proponents of the process and procedures of education were widely read in professional journals and household magazines. Many people argued that the public schools were not doing the job. Others did not criticize, but were proponents of new procedures for educating youth.

During the last decade, we've seen the field of education smothered with jargon. We speak now about a "systems approach," "individualizing instruction," "schools without walls," "schools in the round," "team teaching," "automated teaching," "multi-media approaches," "instructional resources centers," "programmed learning," "computer-assisted instruction," and a proliferation

of technical terms that makes one wonder if we know what the hell we're really talking about. Jargon and new processes have no place in the arena of education without first describing how they are going to better effect learning. We must examine this proliferation of terminology, of learning techniques, of systems, facilities, materials, and so forth, with a critical eye as to whether this is indeed a new technology in education with a central focus on helping the youth reach maximum potential, or whether it is an excuse to perpetuate the present education system for the system's sake.

If we accept the criteria of either successful employment, graduation from high school, or entrance into college, then we can say that public schools have been successful for 60 to 70 per cent of the population. However, educators have assumed the posture of holding that their system must be effective for all the youth of the country. With this as a basic premise, we can now assume that alternative approaches to the education of between 30 and 40 per cent of the population must be provided.

The U.S. Office of Education, in funding Model 2, is attempting to determine whether such a procedure can be successful for those who have not found success in conventional school programs. The basic plan of Model 2 is to redirect academic process to afford better motivation and reinforcement and immediate feedback in a real-world setting. This attempt affords opportunity to design a system which indeed makes programs more relevant for every youth with respect to his own interest, defined learning styles, and capabilities. The environment is not perceived as the usual vocational dumping ground; it is an alternative approach that might be selected by any and all students, be they potential astrophysicists or bricklayers. Under the premise of this program the student will have an equitable opportunity to explore himself and to begin to develop solid data about himself, his interests, and where he might elect to go in the world. It is not a vocational program--it is an education program that enhances the student's capability to immediately relate academic experiences with the real world of work as it exists today and as it will be evolving during his life span.

The purpose of Model 2, the Employer-Based Education Program, is to increase the development and utilization of the country's human resources by creating a set of interrelated academic and work-learning experiences for youth which will enable the learner to become a self-directed, future-oriented decision-

maker. We envision three important components to this education experience--the academic-related areas, the career-related areas, and, perhaps most important, the areas of interpersonal skills in which the student will learn to be a better decision-maker through a systematic accumulation, analysis and synthesis of data as it comes in from four primary sources: (1) standardized test results; (2) evaluation by teachers and counselors within the learning components; (3) data with respect to his experiences in the world of work as reported by those who observe his on-line behavior; and (4), probably of greatest significance, the learner's perception of the relationship between his work experience, his academic experience, and his avowed interests and aspirations. In other words, we want the learner to become a rational decision-maker through the accumulation of objective data which he assimilates in a scientific, personally responsible fashion.

In very general terms, what do we see this program looking like in the real environment? Envision a large metropolitan area in which 5 to 10 large industries have joined with selected small businesses, a hospital complex, social service agencies, regional and state governmental facilities, and the city government with its police, fire, and sanitation departments. Let's assume that each of these industries has made space within its complex available to the program to establish learning centers. Based on predilection and diagnosis of his interest and educational background and needs, the student would be assigned to begin a learning experience on one of these sites. During the early part of his exposure, the student may move from the center, located, for example, in the RCA production facility, to an on-line site to observe work activity. In the initial stages, this observation period could be as short as 15 to 30 minutes. Following this observation, the youth would then return to the learning center and the master teachers and counselors in the center would begin to help him relate his observational experiences to the prescribed educational program.

During any one day the youth may move from the RCA site to an automobile production site to the mayor's office to a day-care center to a hospital laboratory. Each experience, then, would be carefully related to the student's educational plan. It should be pointed out that a student may be checking into a number of different learning centers during the day. The input from the student's education and work experience would be recorded and stored in

a central facility in order that the youth may recall these data, and the learning center located in another facility. Thus, the continuity would be maintained for the student throughout all the learning centers. Efforts would be made to help the youth analyze his education and work sampling activities in order that he may begin to plan his own educational program, choosing from a wide range of work alternatives. As the student's self-understanding increases, the length of the period of observation at a particular site may be extended and a particular field may be examined. At some point in time, the youth's interest and educational direction would begin to converge, so that by year three of the program he may be examining in depth two to four separate vocational clusters.

However, it must be emphasized that this program is not considered as a training program but as a real-life experience. The base-line data to help the student make decisions about himself would include (1) the educational staff's analysis of his progress in the various academic fields, (2) the report from the persons observing the student in the work situation (this may be a worker, the foreman or a paraprofessional, or the teacher who may also observe that situation), (3) test data, and (4), the most important, the student's own assessment of the various learning experiences. As the data begins to converge, the student may (1) decide to pursue a selected field of higher education, or (2) reach the point at which he decides that he definitely wishes to enter a particular field of training (at this point the program would make every effort to locate a training situation for him but would not provide the training itself), or (3) decide that the program is not for him and therefore return to the other alternative programs provided in the public school system, or (4) decide to drop out of the system altogether. If the data from the four sources indicate that now the youth has had a substantial opportunity to examine the various alternatives and has made a decision about his own future, without undue influence from his parents, his friends, or the pressures of society, then the student's decision is accepted as valid.

The picture that we're trying to draw is one in which the youth now becomes capable of making an objective assessment of the world around him and reaches a decision based on this objective assessment. This assessment may be threatening to parents, to the educational system, to the industrial system, to society, or maybe even to the employer-based model itself. But the goal of this program is to help the youth learn that it is his own decision. There-

fore, it is our responsibility to give him every opportunity to collect the appropriate data from the academic environment and from the real world and to analyze it objectively in order that he may have every opportunity to make the very best individual decisions.

We believe that an educational environment under the aegis of an employer-based situation will offer the student an opportunity for broadening his experimental background by accumulating very important facts to determine his direction for the future while at the same time affording opportunities to appreciate why other people go in their respective directions. This will also form the basis for the development of what we perceive to be the most important element in the education of students, a rational decision-making process. Probably predominant among all of these notions is that now, for the first time, the student will have a real opportunity to actually examine the educators and their theories, and indeed test one of the underlying premises of our society, that of free public education for all youth, and its capability for preparing them to take their rightful places as citizens of a free society.

The successful implementation of the employer-based model is predicated on the definition of six organizing elements. These organizing elements will serve as a vehicle for communication about the employer-based model and will permit the orderly processing of information prior to the establishment of the program and during the implementation and evaluation of the employer-based model. These six elements will be used in the overall strategy for identifying, defining, processing, and facilitating successful implementation. Basically, the strategy to be used with each of the elements has some common characteristics across all of the elements. These include delineation of task, assessment of task, assignment of task to noted experts in each of the respective areas, the conceptualization process, testing of feasibility, and the development of alternative approaches.

The first of the six elements is the most important one, as we perceive it, that of the learner. He is the reason for being. Too often the cart is put before the horse in developing educational programs and we certainly do not want to do this. It seemed most relevant for us in developing the Model 2 concepts to first delineate student needs, then design a learning environment and staffing arrangements to meet those needs. After this, we need to find the method of management that would best facilitate learning within the stated environment. The learner is perceived as having four needs: social, emotional,

intellectual, and physical. He is seen as an individual located anywhere in the spectrum, in terms of aptitude, achievement, and aspirations. The environment in which the learner functions must be responsive to any of these needs at any level, as perceived by the learner himself, or through staff diagnosis.

The learning environment element is perceived as containing the programming and staffing, or, as we like to say, the hardware, software, and humanware aspects of the program. Such an environment will be comprised of academic, career, and interpersonal learning experiences conducive to the development of the total individual, with heavy emphasis placed on feedback mechanisms, reinforcement, and motivation.

The third element is supportive ancillary services. In accordance with the philosophy of Model 2, a number of such potential activities may be identified in advance. For each potential activity, a service is perceived. It is hoped that most of the services can be provided through subcontracts with agencies which have already been established. In other words, we will be looking at the existing environment, looking at the agencies which have the various supportive services, such as those providing medical and dental care, and the child support services, and ask them to be involved either on a contract basis or a non-contractual basis in supporting this program. The interagency relationship is considered to be one of the most important aspects of this program. We perceive the interagency relationship and the involvement of the government agencies, whether they be at the federal, state, or local level, as vital resources for the youth to have particular experiences in, for the youth to observe, and also as important for the data and support that such agencies can provide.

In terms of governance and management, we perceive that we cannot develop either one without first delineating student needs, learning environment, staffing, and supportive services; then, we can better develop something called the management and governance system. We should try to avoid as much as we can the kind of management that is usually perceived as something bad by workers in industry. We want to avoid the kind of management in which governance is performed by a rule-making body and has as its function the dictation of modes of conformity, implying that if the student does not conform, he can jolly well get out of the environment because it is the needs of the industry that are met. I hope we don't go along any of such lines whatsoever.

Kids need something different, and we are not meeting the needs of all kids. The incentives that we can delineate would be those for the consortium involved, the learner, the parents, and even the public schools which would reap some benefits from a program such as this. Let me finish, then, by quoting something that, very appropriately, our President has said, "When educators, school boards, and government officials alike admit that they have a great deal to learn about the way to teach, we will begin to climb the up staircase to a genuine reform." We have, I believe, begun to climb that staircase; we have begun, at least in part, the difficult continuing work of reform. These recent tumultuous years of challenge and strife and all-encompassing change have given us lessons to learn, especially lessons in humility. But they have also taught us to hope and to act.

II.

CAREER DEVELOPMENT AND SYSTEMS AT THE AMERICAN INSTITUTES FOR RESEARCH

INTRODUCTION

The second part of the Conference gives us in the American Institutes for Research opportunity as your hosts to indicate our work in career development and related systems in some detail. We do so by telling you about Project TALENT--some methodological puzzles in career psychology and some of its five-year results using a fruitful solution to the posed puzzles--Project PLAN, and the Comprehensive Career Guidance System. This work spans our effort in career development research, teaching about career development, and constructing a needs-based system for individual development in careers. The ensuing papers present each of these three AIR projects in sufficient detail to obviate any need for me to expand further on any one of them.

THE PROJECT TALENT APPROACH TO THE CAREER-GROUPING PROBLEM: CUTTING THE GORDIAN KNOT

*Marion F. Shaycoft**

For many years researchers concerned with career guidance and career planning have been trying to develop or use statistical methodologies applicable to the problem of grouping careers. The goal has been to establish career groupings, and principles by which each kind of job or career can be assigned to one and only one of the groups thus established. The purpose--and it is a very important one--has been to facilitate career guidance by cutting the number of alternatives from several thousand (the number of different kinds of jobs) down to a much smaller and more manageable number (the number of career groups, each group consisting of many different kinds of jobs).

Ideally, of course, from the viewpoint of their use in vocational guidance all the kinds of jobs or careers in a career group should be very similar in the sense that they require the same pattern of aptitudes and traits of temperament, and much the same preparation. Such classification of jobs into fairly homogeneous categories for purposes of career guidance is useful because it maximizes flexibility. Boys and girls of high school age aren't channeled into a narrow pathway that leads to one and only one kind of job. Instead, they maintain as many options as possible as long as possible.

Researchers into the career categorization problem have used a variety of multivariate analysis and other techniques in their explorations--various kinds of profile analysis, multiple discriminant analysis, and hierarchical analysis, to name just a few.

We on Project TALENT are among those who have used hierarchical analysis** to explore the career-categorization problem. Hierarchical analysis is a

---

**Marion F. Shaycoft is Associate Director of Project TALENT, American Institutes for Research, Palo Alto, California.*

***Flanagan, J.C., Shaycoft, Marion F., Richards, J.M., Jr., and Claudy, J.G. Five Years after High School. Palo Alto, Calif.: American Institutes for Research, 1971. Chapter 5.

multivariate analysis procedure designed to reveal the "natural groups" into which the entities being classified fall--if such natural groups in fact exist.

A word or two about Project TALENT is in order at this point. In 1960 several hundred thousand high school students--all the 9th-, 10th-, 11th-, and 12th-graders in a stratified random sample of all the secondary schools (parochial and private as well as public) in the United States--were given a comprehensive two-day battery of tests measuring aptitudes, achievement levels, and patterns of information, and questionnaires (inventories) to secure information about their interests, traits of temperament, and background characteristics. The purposes of the project, as originally stated, have been:

1. To obtain a national inventory of human resources.
2. To develop a set of standards for educational and psychological measurements.
3. To provide a comprehensive counseling guide indicating the patterns of aptitude and ability which are predictive of success and satisfaction in various careers.
4. To formulate a better understanding of how young people choose their life work.
5. To identify the educational experiences which better prepare students for their life work.

In line with some of these purposes, particularly the last three, we have been following up the members of the sample on a long-term basis, to find out about their post-high-school educational activities, jobs, long-range career plans, and other matters related to their early adult years. Follow-up questionnaires were sent to members of the TALENT sample one year after high school, and again five years after; now we are following these same young men and young women up a third time, eleven years after high school.

In processing the returned questionnaires, the respondents' long-range career plans are classified into one of nearly 1000 categories, using a four-digit code for the purpose. This is a "hand operation," done by a crew of coders. Essentially the same set of codes and the same procedure are used for coding the respondents' current jobs. This 1000-group categorization system was designed specifically for Project TALENT. It is an expandable code, and obviously one that incorporates considerable detail. It is not identical with

the coding system used by the Department of Labor in its Dictionary of Occupational Titles, nor with any other system previously in use. The Dictionary of Occupational Titles code serves admirably the purpose for which it was developed, but for our purposes in Project TALENT research different emphasis was needed, with far less detail in certain areas and somewhat more in others; hence the need to develop our own coding system. One of the special requirements of the Project TALENT code was that it had to provide the capability of handling incompletely developed career plans; e.g., something as vague as the statement by the respondent that he wants to "work with people"; or perhaps that he wants to "work for the government".

Since the nearly 1000 categories of the four-digit code are far more than can be handled conveniently in most data analyses it was recognized at the outset that some subsequent collapsing of categories would be necessary. Why, then, did we start out with a more detailed code than we were going to want to use in specific research investigations? The answer, of course, is that we wanted to allow maximum flexibility in combining categories later on, to permit different kinds and degrees of condensation of categories for different purposes. And as things turned out, that is exactly what happened; different researchers combined categories in different ways. The purpose of the present report is to discuss one line of research on the subject of combining categories. The first step, after all of the questionnaire responses, including the job and career-plan four-digit codes, had been put on computer tape, was to add a simplified categorization of jobs and career plans to the tape. This was accomplished by converting the thousand-category four-digit codes to a somewhat coarser grouping, containing only a couple of hundred categories and utilizing a three-digit coding system. These coarser categories were established on a judgmental basis, by combining some of the four-digit categories into a single category in the three-digit system. This was in fact not a very drastic condensation. It was regarded as merely the first step in reducing the number of categories for potential use in educational and career guidance of high school students. As has already been suggested, the intention was to undertake a program of exploratory research into ways of combining the groups further, to get a very much smaller number of groups.

One additional step was necessary, however, before this exploration could be undertaken. This step was "purification" of the career-plan groups. In

using the TALENT Battery to predict success in a particular career field, a criterion is needed; but for many career fields five years after high school was a little too soon for prospective entrants even to have finished their training and actually started work in the field. And it was far too soon for them to have been in the field long enough for any criterion of quality of performance to be available. At this stage, then, the only practical criterion was the "group membership" criterion--i.e., the dichotomous variable indicating whether the person was or wasn't actually in the career field in question. Group membership is far from an ideal criterion; and it is certainly not an "ultimate criterion." But in view of the practical realities it was and is a useful proximal criterion, and has been utilized as such. And as a further acknowledgment of practical realities such as the lengthy training and preparation periods that are required for many careers, the definition of group membership was expanded to include not only those who had already obtained a job in the career field in question but also those who had realistic plans or expectations of doing so eventually. It was in regard to the matter of whether a person's career plan was reasonably realistic that "purification of career-plan groups" entered the picture. Individuals were eliminated from the "purified" groups if their follow-up data made it extremely unlikely that their career plans would ever be realized--for instance if a young man said he wanted to be a doctor but five years after high school hadn't even entered college yet and apparently had no plans to do so, he would be eliminated.

Hierarchical Analysis

The initial concept we started out exploring was that each occupational category (e.g., lawyer, doctor, welder, secretary, accountant, computer programer, psychologist, policeman, jockey, baseball player) falls naturally into one of a small number of natural clusters, these clusters being such that all occupations within a cluster are characterized by very similar patterns of aptitudes, abilities, interests, traits of temperament, and background, while between clusters there are substantial differences in these respects. Hierarchical analysis was the methodology chosen for use in the exploratory phase. On the basis of theoretical considerations it appeared that if any analytic approach were going to prove effective in establishing job families,

hierarchical analysis would be that approach. In a hierarchical grouping procedure, one starts with a set of separate entities and the task is to decide how to combine them to get groups within which there will be considerable homogeneity but which will differ markedly from each other. In the case with which we are concerned the entities are job categories, or to be somewhat more precise, long-range career-plan categories since five years after high school not everyone had as yet actively entered the field which he planned eventually to make his career. These entities, career-plan categories, are described in terms of 109 numbers--the mean scores of the young men or young women in the category, on 109 variables (64 cognitive and 45 noncognitive) of the Project TALENT test battery. The hierarchical analysis procedure operates in a stepwise fashion, to combine entities whose index of difference is as low as possible or whose index of similarity is as high as possible. Difference may be expressed in a number of ways: as distance between entities, as dispersion of the combined group, or perhaps as a ratio of distance to dispersion. Likewise similarity may be expressed in numerous ways--as some measure of the amount of overlap between groups, for example. Thus the term hierarchical analysis doesn't cover just a single specific procedure. Rather it represents a whole family of procedures--so that the decision to use hierarchical analysis is just the starting point for a long series of methodological decisions. After careful consideration of the pros and cons of various possible procedures the hierarchical analyses were carried out in the following way:

1. Separate analyses were carried out for the 64 cognitive and the 45 noncognitive variables.
2. Orthogonal variables were used. Since the original 64 cognitive (or 45 noncognitive) variables were not all uncorrelated, and since it seemed desirable to use orthogonal variables in the hierarchical analysis, it was decided to do a complete principal components analysis of the 64 cognitive variables and a separate principal components analysis of the 45 noncognitive variables, and then to obtain each individual's scores on the principal components.*

*For this purpose each principal component was scaled to have a standard deviation of 1.

Principal component scores are suitable variables for use in the hierarchical analysis, since they are automatically orthogonal. Each individual was then hypothesized to be represented by a point plotted in 64-dimensional (or 45-dimensional) hyperspace, where the dimensions are the principal components. The location of the centroid* of each career-plan group was then determined.

3. Groups were then combined on the basis of how close together their centroids were. In addition to trying geometric distance between centroids as the basis for combining groups, five other functions, mostly variants of simple distance, were also tried.

The results were somewhat disappointing (at least they were disappointing initially) in the sense that they didn't conform to prior expectations. Hierarchical analysis just didn't reveal tight clusters of occupations, into which the groups fell naturally. Of the various formulas that were tried out, the simplest one, the simple distance formula, turned out to work about as well as any of the more complicated formulas and better than most. But none of them worked really well. The occupational groups just didn't combine neatly into tight clusters, and no formula, however complex and sophisticated, seemed about to make it appear that they did. With some modification of the procedure for interpreting the results--in other words modification of the set of rules for deciding where one group left off and a new one started--it was possible to develop some reasonable groups from the data; but to do this required the application of substantial doses of subjective judgment (which is really an inherent feature of the hierarchical analysis approach anyhow).

Table 1 shows the groups that were formed as a result of this modified hierarchical analysis and Table 2 shows the contents of each group--in other words the occupational categories included in each. These groupings have some utility, but they do not necessarily constitute the only possible useful way of doing the grouping. They represent, rather, just one of a potentially large number of equally satisfactory ways.

---

*The centroid is the point corresponding to the group's means on all 64 (or 45) principal components. (It should be noted that the use of centroids in this way automatically weights each principal component variable in accordance with its effectiveness in discriminating among groups. In other words dispersion among group means is far greater for those components that discriminate effectively among groups than for the ones that don't.)

TABLE 1. Job Families for Males*: Partial list
(Based on 5-year follow-up of grade 12 boys)

		No. of career groups included	No. of cases included
A.	Airplane pilot	1	99
B.	Business and industry	19	2885
C.	Architect	1	58
D.	Engineering and applied physical sciences	12	1108
E.	Math and physical science: quantitatively oriented professions	5	287
F.	Biological sciences: theoretical and applied	6	154
G.	"People-oriented" professions in the sciences	4	500
H.	Professions in the social sciences	4	763
I.	College professor: English	1	57
J.	Clergyman	1	176
K.	Teaching and other "people-oriented" professions (non-science)	6	734
L.	High school math teacher	1	62
M.	High school science teacher	1	50
N.	High school physical education teacher	1	57
O.	Miscellaneous skilled occupations	7	673
P.	Technician	6	610
Q.	Miscellaneous "blue-collar" jobs	18	1543
R.	Farming	2	372
S.	Protective	4	259
Y.	(Undecided)	-	803
		100**	11250***

*Based on two hierarchical analyses, one in 64 dimensions (principal components of 64 cognitive variables) and the other in 45 dimensions (principal components of 45 noncognitive variables).

This table includes all groups having at least 50 cases (in the five-year follow-up of grade 12 boys). Some smaller groups are also included which fit into a family defined by the larger groups.

**Includes 7 duplications; therefore 93 separate categories.

***Includes 756 duplications; therefore 10494 separate cases.

TABLE 2. Present composition of the job families

Job Family	Career Code	Career***	No. of cases
A.	841	Airplane pilot	99
B.	112	In business for self (NEC)	278
	120	Industry or business (NEC)	141
	711(2)	Banking and finance	116
	716	CPA	280
	717	Accountant, auditor, comptroller (exc. CPA)	202
	723	Efficiency expert, industrial engineer, production management	111
	730	Business management, business administration (NEC)	511
	731	Manufacturing management	95
	732	Wholesale or retail trade management; marketing	195
	746	Insurance salesman	61
	748	Salesman (NEC)	350
	749	Sales manager	73
	726	Personnel administration	81
	335	Pharmacist	91
	222*	Computer programer	121
	642*	U.S. Armed Forces: officer	108
	747**	Auto salesman	22
	743**	Stockbroker	23
	745**	Real estate sales	26
C.	250	Architect	58
D.	240	Engineer (NEC)	167
	241	Civil and/or hydraulic engineer	105
	242	Electrical and/or electronic engineer	243
	243	Mechanical or automotive engineer	143
	231*	Chemist	81
	642*	U.S. Armed Forces: officer	108
	222*	Computer programer	121
	244**	Aeronautical engineer	37
	245**	Chemical engineer	58
	234**	Geologist	17
	235**	Meteorologist	10
	230**	Scientist (NEC)	18
E.	211	Mathematician	46
	232	Physicist	64
	231*	Chemist	81
	462*	College professor: science	68
	461**	College professor: math	28

TABLE 2. (Continued)

Job Family	Career Code	Career***	No. of cases
F.	310	Biologist, zoologist, botanist, etc.	32
	314	Specialist in fish, wildlife, forestry, conservation, etc.	49
	313**	Specialist in agricultural science	35
	316**	Microbiologist	15
	317**	Biochemist	9
	322**	Surgeon	14
G.	329	Physician (NEC)	229
	332	Dentist	97
	360*	Psychologist	106
	462*	College professor: science	68
H.	360*	Psychologist	106
	393	Lawyer	393
	463	College professor: social studies	85
	460	College professor (NEC)	179
I.	464	College professor: English	57
J.	521	Clergyman	176
K.	400	Teaching (NEC)	423
	420	High School Teacher (NEC)	69
	423	High School Teacher: social studies	94
	450	School administration (principal, etc.): except college	43
	370	Social work	60
	412	Teaching elementary school	45
L.	421	High school math teacher	62
M.	422	High school science teacher	50
N.	429	High school physical education teacher	57
O.	861	Printing trades	106
	758	Computer operator, etc.	78
	798	Miscellaneous administrative	38
	797	Miscellaneous clerical	112
	864	Draftsman	101
	738	Supervisor (in a business)	87
	661*	Police (public)	151

TABLE 2. (Continued)

Job Family	Career Code	Career***	No. of cases
P.	811	Electronic technician	212
	125	Electronics (NEC)	156
	299	Lab technician, research asst., etc. (in physical sciences)	78
	222*	Computer programer	121
	347**	Medical and dental technician; technician in biol. and clinical sciences	16
	348**	Medical and dental technologist	27
Q.	102	Foreman (NEC)	49
	810	Electrician (NEC)	168
	812	Appliance repair	55
	820	Mechanic (NEC)	116
	821	Auto mechanic	74
	822	Airplane mechanic	68
	828	Machinist	176
	832	Carpenter	55
	833	Metal trades	92
	834	Bricklayer, mason rooter, printer, plasterer, etc.	62
	835	Plumber, pipefitter	72
	837	Misc. building and construction	71
	899	General labor (unspecialized)	277
	853	Auto, bus, and truck driver	85
	824**	Industrial machine repair	21
	813**	Phone installation, repair, maintenance	39
	838**	Mining, quarrying, well-drilling	16
	836**	Operating earthmoving equipment; roadbuilding	47
R.	631	Farm or ranch owner	128
	639	Farming: other and miscellaneous	244
S.	661*	Police (public)	151
	666	Fireman	41
	640	U.S. Armed Forces (rank unspecified)	54
	641**	U.S. Armed Forces enlisted personnel	13
Y.	001	(Undecided)	803

*Included in more than one group.

**Tentatively included in the group, on the basis of subjective decision, since the N is too small for conclusive empirical data.

***NEC means "Not Elsewhere Classified."

Significance of the Hierarchical Analysis Results

What significance are we to attach to the fact that there were so many jobs that didn't fall in tight clusters and so few that did? Probably the basic significance of this outcome lies in all that is implied by the apparent nonexistence of a clear hierarchical structure underlying the career groups. The centroids of these career groups are to a great extent scattered widely rather than falling neatly in tight little clusters. The patterns of aptitudes and abilities that characterize various jobs are perhaps almost as diverse as the corresponding patterns for people. Furthermore even within certain occupational groups as identified by job title there are really many quite widely different jobs with widely different patterns of aptitudes and interests required. Within the occupational category M.D., for instance, consider the great difference between what surgeons do and what psychiatrists do. Likewise in the engineer category, civil engineers probably differ more from electronic engineers than they do from those in certain non-engineering occupations. And there are enormous differences, in terms of abilities, interests, and job duties, among those who call themselves computer programers.

Thus not only does hierarchical analysis of occupational groups fail to reveal a unique underlying structure of occupational clusters, but it seems inevitable that any other analytic approach would likewise fail to do so.

An Alternative Hypothesis and an Alternative Approach

It has been implied in the previous section that further efforts to make an analytic procedure reveal the one true set of groups is probably fruitless. But this doesn't mean that we should abandon efforts to group occupations for practical purposes in education and guidance. The practical purposes are too important to be abandoned merely because an obvious and rather widely held initial hypothesis doesn't seem to hold.

If we can't find a unique solution, let us cut the Gordian knot, by recognizing that from a statistical viewpoint there isn't any one best solution but rather a multiplicity of solutions, all about equally good in terms of statistical criteria. And instead of regretting this absence of a definitive solution let us rejoice in it, because it means that we won't be faced with the dilemma of having to choose between a solution which has desirable

statistical characteristics but is undesirable from a practical viewpoint and a practical solution for which there is no statistical support. With a vast number of solutions to choose from, all equally sound from a statistical viewpoint, we are free to choose the one that best meets practical demands.

The hypothesis is here proposed that occupational centroids (i.e., sets of means on a number of variables for the members of an occupational group) form a multivariate normal distribution (just as the variables for individuals do). For example if the scores of 15,000 young men from the TALENT sample on 64 cognitive variables constitute a multivariate normal distribution (in 64 dimensions), then the centroids of the approximately 200 occupational categories into which they fall are also likely to constitute a multivariate normal distribution (in the same 64 dimensions). This really seems like a much more plausible and more reasonable assumption than the one that the use of hierarchical analysis implies--namely the assumption that the centroids have a multimodal distribution (with as many modes as there are groups to be formed) rather than a unimodal distribution.

To form groups then, using the proposed unimodal model, all that is necessary is "to chop space up into a number of chunks." All occupations whose centroids fall in the same chunk would be in the same group. The figures which follow show how this would work. All eight figures show the same configuration of points (each point representing the centroid of an occupational category) plotted in two dimensions (because it isn't feasible to plot in 64 or 109 dimensions).

In Figure 1a the plane containing the two dimensions (two variables, F_1 and F_2) has been broken up into squares by a grid. The lines of the grid are parallel to the axes, but there is no reason why they have to be. Figure 1b shows the grid rotated to an oblique angle. Which grid is better would depend on which gives the more useful groups.

Now suppose instead of using squares, we break the plane up into triangular chunks--specifically, uniform equilateral triangles, all of the same size as the squares in Figures 1a and 1b. Figure 2 shows this. Presumably the Figure 2 grouping isn't as good as either Figure 1a or 1b, because triangles are less compact figures than squares, so that one expects the points (centroids) within a triangle to be further apart--in other words to represent less similar

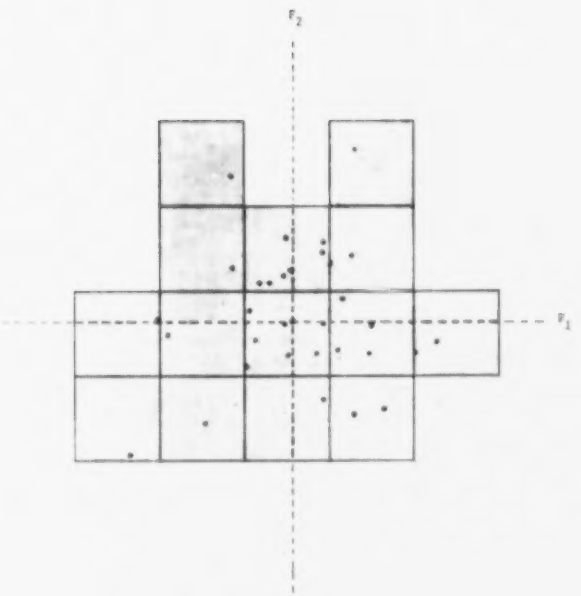


Figure 1a
(14 groups)

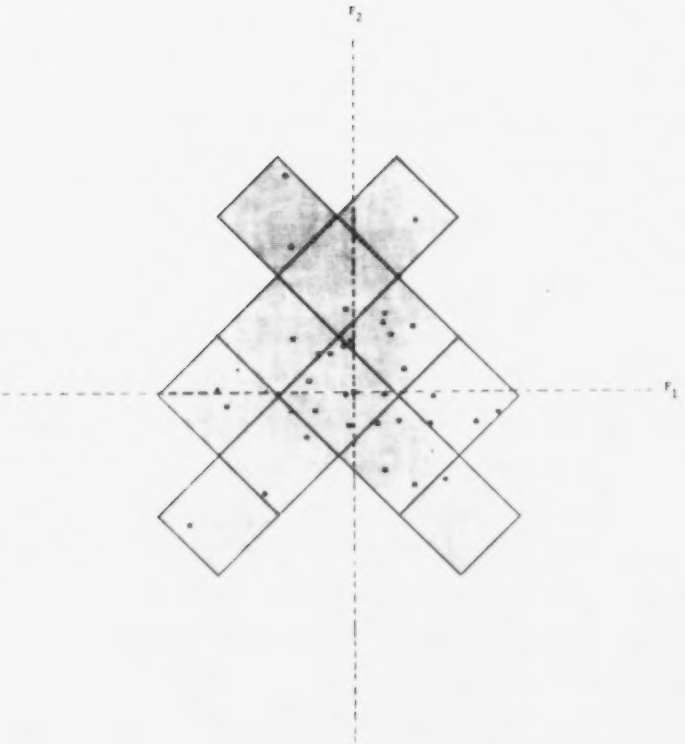


Figure 1b
(12 groups)

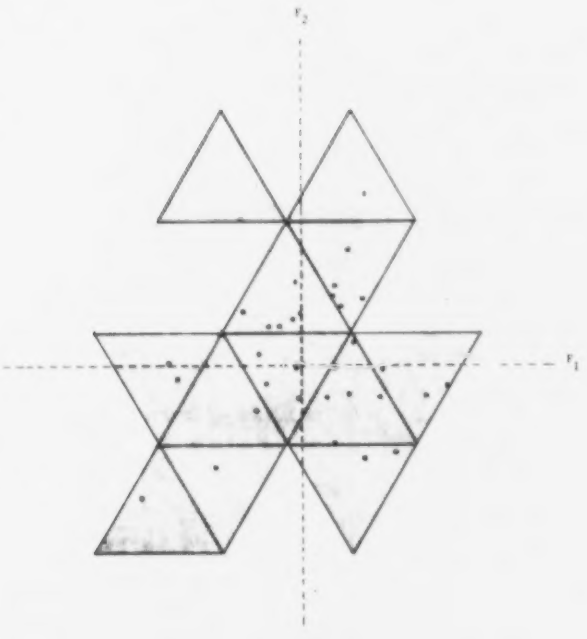


Figure 2
(12 groups)

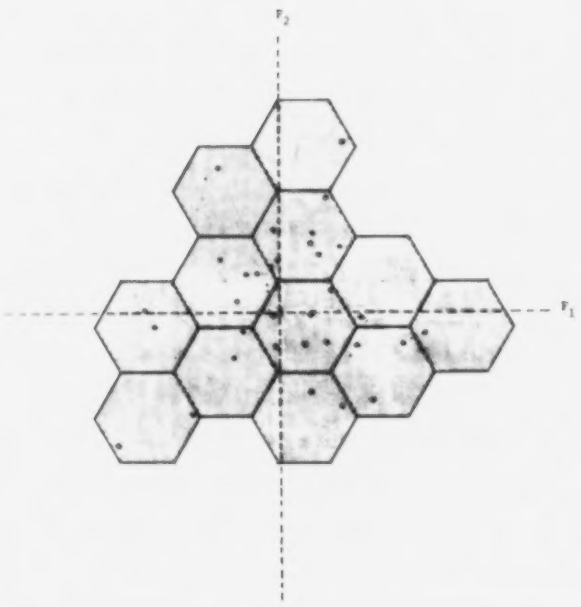


Figure 3
(12 groups)

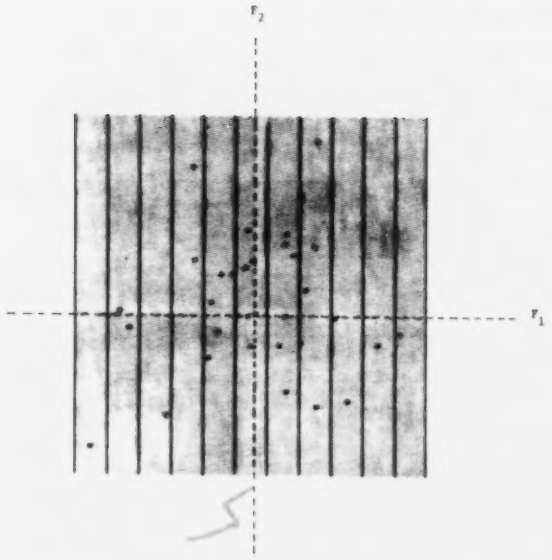


Figure 4a
(11 groups)

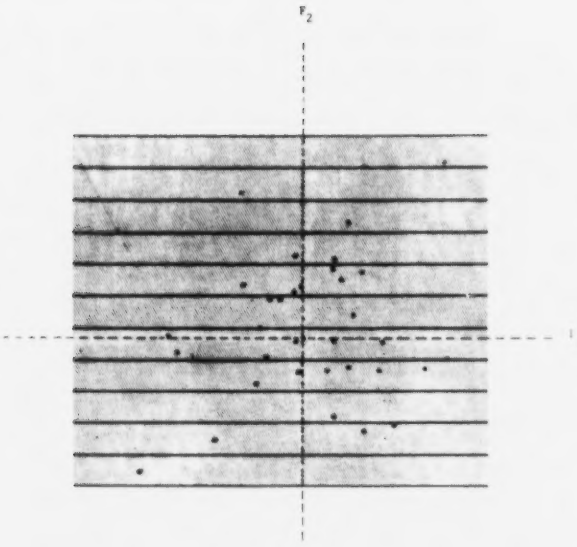


Figure 4b
(11 groups)

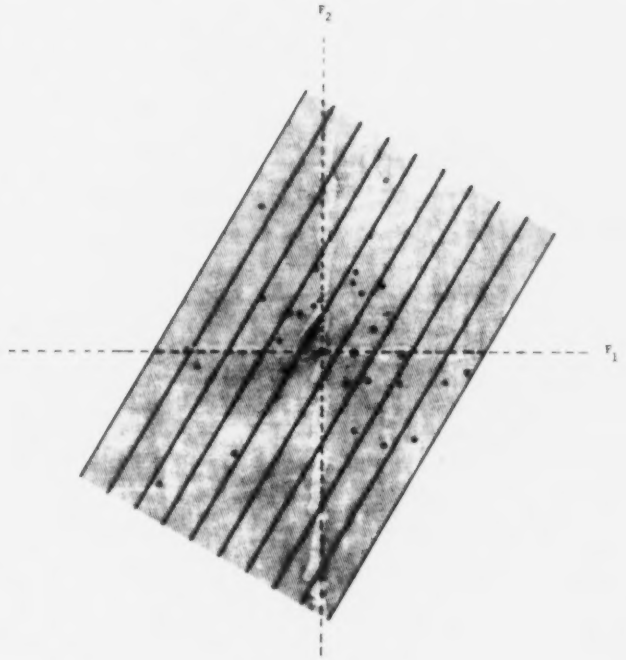


Figure 4c
(9 groups)

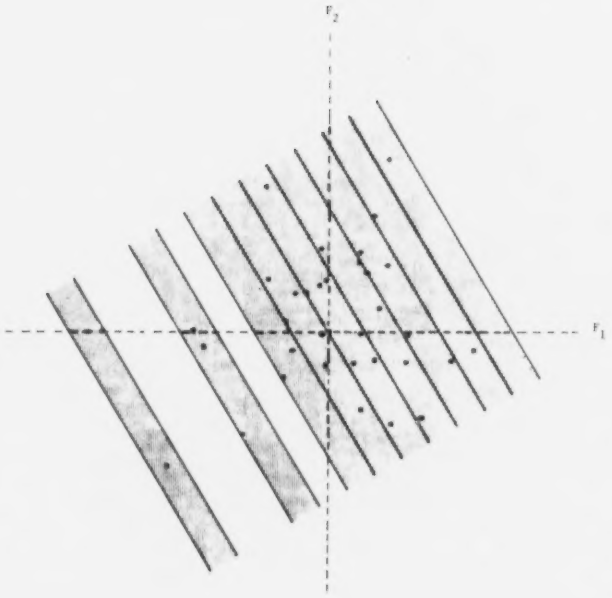


Figure 4d
(9 groups)

groups--than the points within a square of the same size. By the same principle, hexagons should be somewhat preferable to squares, because they are more compact.*

If instead of dividing the space into uniform polygons, such as hexagons, it is divided into narrow strips, as in Figures 4a, 4b, 4c, and 4d, the groups are much less compact, and consequently less satisfactory.

Conclusions

1. In developing ways of grouping occupations, hierarchical analysis is not a promising mode for future exploration. The data are not likely to fit the model.

2. A method has been proposed which explicitly leans much more heavily on practical considerations. It provides a multiplicity of ways of dividing occupations into fairly homogeneous groups, and it provides one basic rule for choosing among these equally sound groupings: choose the way that will be most useful from the point of view of guidance and educational requirements.

3. Occupations don't naturally fall into a very small number of widely separated clusters. There are probably occupations that fit almost any pattern of aptitudes, interests, and other traits that anyone is likely to have. Therefore in selecting a career field there should be less need for a square peg--or even a scalene-triangular peg--to force himself into a round hole than there would otherwise be. Figuratively speaking, the full range of jobs should include lots for scalene triangles of different shapes and size!

---

*Of the regular polygons used in these figures (triangle, square, hexagon) the hexagon is closest to a circle, which is the most compact plane figure there is, geometrically speaking. The regular hexagon is the most compact figure into which a plane can be uniformly divided. There are more compact plane figures--a regular octagon, for instance (to name only one of an infinite multitude)--but a plane cannot be uniformly divided into them.

SOME FINDINGS FROM PROJECT TALENT REGARDING CAREER PLANS*

*John C. Flanagan***

In March of 1960, a battery of tests, including 64 cognitive and 45 non-cognitive measures requiring about two days of school time, was administered to a representative sample of students in Grades 9, 10, 11, and 12 in American high schools. The tests were developed specifically for this project under the general supervision of a distinguished panel of advisors.

A stratified random sample, including 955 senior high schools, public, private, and parochial, representing the entire United States, was selected. These schools with their associated junior high schools were then invited to participate in Project TALENT. A very high proportion of schools accepted our invitation and the tests were administered in 882 senior high schools and their associated junior high schools including a total of about 430,000 students.

Scores, biographical data, plans for educational and occupational activities, and a large number of individual item responses were stored on computer tape. From these tapes a variety of analytical data were tabulated and a number of reports indicating desirable improvements in the American educational system have been published over the past ten years.

These students were sent questionnaires regarding their educational and occupational experiences one year and also five years following graduation from high school. By the use of repeated reminders a good response was achieved. To correct for biases which would have resulted from those not responding, a special sample of about four or five per cent of the nonrespondents were intensively followed up by field interviewers. The data were obtained for about 80% of them which provided a sound basis for correcting the mail response figure for nonrespondent bias. Thus, very trustworthy results were obtained regarding the activities of these groups.

The principal function of this report is to present some of the findings based on the Five-Year Follow-Up Studies. More than 129,000 of the original

---

*Presented at the International Association of Applied Psychology, XVIIth International Congress, Liege, Belgium, 25-30 July 1971.

**John C. Flanagan is President of the American Institutes for Research.

group completed questionnaires during the five-year follow-up phase. Table 1 reports the numbers of students in various grades in Project TALENT and those responding to the Five-Year Follow-Up Questionnaire. The analysis of these results has provided a very valuable basis for educational planning. For the first time, it is possible for American youth to compare their abilities, aptitudes, interests, and preferences with those of students having similar characteristics in high school who five years out of high school were either already beginning a career in a specific occupational field or were in relatively late stages of preparation and training to enter this field.

To provide a general overview of the extensive data made available by this study, the relative standing on twelve measures of developed abilities for males entering 35 different occupations is presented in graphic form in Table 2. Table 3 presents a similar graphic summary of the performance on these tests of females who entered 24 different occupations.

One of the main purposes for conducting a long-range follow-up study of this type was to obtain data for use by individuals in planning their educational and occupational goals. Guidance personnel in secondary schools have, for many years, counseled against making too specific a vocational choice too early. This has developed a need for a grouping of occupations in terms of educational and ability requirements which could provide a sound transition from the choice of several large areas to a specific occupational goal. The data from Project TALENT were ideal for this type of study of optimal grouping of various occupations. Using the data from the Five-Year Follow-Up, tentative groupings were prepared based on very similar educational requirements at the secondary school level. These tentative groupings were then checked by comparing the means on various important measures both within and betweeen the tentatively selected groups to check on their homogenity. A number of changes were made on this basis. The final basis for confirming or modifying the tentative groupings was the calculation of d-square. This d for any two occupational groups represents the distance in k-dimensional space where k is the total number of variables, 109 in this instance, between the points representing the center of the two clusters of individuals planning careers in these two occupational groups.

Only a very few changes were indicated by this analysis and the final grouping can therefore be considered to have been empirically validated on the basis of a very large and representative sample. In Table 4 are presented these occupational goal groups. The occupations included in this table are

based on analyses of the follow-up data for the 11th and 12 grade students and include only those occupations with a very substantial number of persons in each of these groups. It is anticipated that it will be possible to add a large number of additional occupations when the results from the 9th and 10th grade analyses are available to add to the present data.

An interesting finding from this research is the trend in modifications of career choice from 9th grade to 12th grade to one-year follow-up to five-year follow-up. These changes are shown graphically for males and females respectively in Tables 5 and 6. To simplify the presentation, the choices are grouped in accordance with the occupational goal groupings presented in Table 4.

Tables 7 and 8 compare the career plans of males and females respectively when they were students in the 12th grade and five years later when they responded to the Five-Year Follow-Up Questionnaire. These also have been grouped in terms of the 12 long-range occupational goal groups. The data in these tables make it clear that the career plans of most 12th grade students are unstable. The wide dissemination of data indicating the instability of career plans obtained in the One-Year Follow-Up study along with other improvements in American guidance programs seem likely to have produced more realistic and, hopefully, more stable career plans among present high school students. A 1970 survey of the students in the 11th grade in a 20% sample of the original Project TALENT schools indicates that career plans in 1970 are much more sophisticated and realistic than those of students in American high schools in 1960.

The final table, Table 9, presents the predictive validities for all of the 109 tests combined and also for combinations of only the cognitive and only the noncognitive tests separately in predicting entrance into some of the occupations in each of the occupational career groups. Especially noteworthy in this table is the agreement between the results obtained for the 11th grade and 12th grade groups.

A limitation of this type of analysis is that the correlation coefficient represents the degree to which those in a particular occupational goal group can be distinguished from the total group of 11th or 12th grade males. Thus, an occupational goal group composed of persons who were clustered about the mean with respect to all of the variables, would have a zero correlation coefficient no matter how tightly the group was clustered about the mean. To correct for this deficiency, Miss Marion F. Shaycoft of the Project TALENT

staff has developed the propinquity index which provides a measure of the closeness of agreement between the individual's scores and those of the occupational group with which he is being compared. Another practical procedure for doing this is to present data regarding the variability of the scores on each of the measures for a particular occupational goal group.

In conclusion, it is believed that Project TALENT already has had substantial impact on guidance procedures in the United States and that the Five-Year Follow-Up data will add a very important type of information to the resources of the individual student trying to select a career and plan his educational program. However, definitive conclusions regarding appropriate career groups cannot be based on data obtained only five years after high school graduation. Therefore, the American Institutes for Research has requested funding from the National Center for Research and Development in the United States Office of Education, the National Science Foundation, and the National Institutes of Health for conducting an Eleven-Year Follow-Up beginning this Fall to obtain a better understanding of both the type of students who enter various careers and also the characteristics of those who are most satisfied and successful in these careers.

It should be noted in closing that another important outcome of Project TALENT has been the utilization of the findings from this study to develop a Program for Learning in Accordance with Needs, called Project PLAN. This new approach to developing a system of computer-supported individualized education was developed with support from the Westinghouse Learning Corporation and 12 participating school districts in both the eastern and western parts of the United States. This system of education, including a sophisticated guidance program based on the findings of Project TALENT, is now available to schools for use in Grades 1-12 throughout the United States.

TABLE 1

NUMBERS OF REGULAR AND SPECIAL RESPONDENTS
TO PROJECT TALENT 5-YEAR FOLLOW-UP
(Including only those in the initially selected sample)

		12th	11th	10th	9th	Total
Total number of cases from selected sample in TALENT tape files (A)	Males	39,692	45,443	50,654	50,171	185,960
	Females	41,483	47,060	49.195	51,500	189,238
	Total	81,175	92,503	99,849	101,671	375,198
Regular respondents to 5-year follow-up (B)	Males	15,108	15,718	15,899	13,227	59,952
	Females	15,616	16,703	15,867	13,905	62,091
	Total	30,724	32,421	31,766	27,132	122,043
Special sample of nonrespondents sent questionnaire (C)	Total	2,074	2,558	2,654	2,531	9,817
Special "nonrespondent" replies (D)	Males	867	1,201	1,060	799	3,927
	Females	936	1,164	984	773	3,857
	Total	1,803	2,365	2,044	1,572	7,784
Grand total respondents (regular & special) (B+D)	Males	15,975	16,919	16,959	14,026	63,879
	Females	16,552	17,867	16,851	14,678	65,948
	Total	32,527	34,786	33,810	28,704	129,827
% total sample in regular respondents (B/A)		37.8	35.0	31.8	26.7	32.5
% special nonrespondent replies (D/C)		86.9	92.5	77.0	62.1	79.3
Overall % of total sample completed (B+D/A)		40.1	37.6	33.9	28.2	34.6

TABLE 2

RELATIVE STANDING OF MALES IN 35 DIFFERENT

	Vocabulary	Memory for Words	Disguised Words	English Total	Word Functions	Reading Comprehensi
					Physician	
	Physician				University Teacher	Physician
				Physician	Physicist	
	Biologist	Physician		University Teacher		Biologist
75th Percentile	Chemist, Physicist University Teacher		University Teacher, Physicia		Clergyman	University Teacher Chemist Physicist
	Electrical Engineer				Lawyer Chemist	Theater Arts Lawyer
	Lawyer	University Teacher		Chemist,Physicist	Electrical Engineer	Electrical Engineer
	Theater Arts		Theater Arts	Clergyman		Clergyman
		Clergyman	Music Teacher		Biologist	
			Lawyer	Lawyer Biologist Electrical Engineer	Music Teacher Theater Arts	
	Clergyman,Music Teacher	Chemist Lawyer,Theater Arts Electrical Engineer	Chemist	Music Teacher	High School Math. Teacher	Pharmacist
	Pharmacist	Physicist	Biologist Social Worker,Elect. Engineer Physicist			H.S. Social Studies Tea
						High School Math. Teac Social Worker
	H.S. Social Studies Teacher Social Worker,Programmer	H.S. Social Studies Teache Social Worker	Clergyman Pharmacist	High School Teacher, High School Math. Teacher	Social Worker,Pharmacist	High School Teacher
	Business Management, High School Math Teacher High School Teacher	Biologist High School Math Teacher Pharmacist High School Teacher	Programmer High School Teacher H.H. Social Studies Teacher	CPA Pharmacist Theater Arts	Programmer	Music Teacher,Programm CPA,Business Manageme Marketing
		Programmer	Business Management CPA Marketing	H.S. Social Studies Teache Programmer Business Management	CPA High School Teacher	
Average Developed Abilities Performance of 12th Grade Males	CPA Electronic Technician,	Business Management CPA Music Teacher Marketing	High School Math. Teacher	Marketing	Business Management H.S. Social Studies Teache	Electronic Technici
	Marketing		Policeman,Computer Operator Salesman	Social Worker	Marketing	
		Salesman	Electronic Technician			Salesman
	Salesman Supervisor	Proprietor	Proprietor Supervisor	Computer Operator	Electronic Technician	
	Policeman	Computer Operator,Draftsman Electronic Technician		Salesman	Salesman	Policeman
	Proprietor Computer Operator	Policeman		Electronic Technician	Proprietor,Computer Operator	Proprietor Computer Operator
		Electrician Farmer	Draftsman			Supervisor
		Printer,Machinist Supervisor Plumber Driver Bricklayer	Printer,Machinist	Supervisor Draftsman	Policeman Draftsman Supervisor	
	Draftsman Machinist Printer	Mechanic	Electrician Mechanic	Policeman	Farmer	Draftsman
	Electrician	Carpenter		Printer	Machinist Electrician	Electrician Printer
	Mechanic		Driver,Bricklayer Plumber			
	Bricklayer			Farmer	Printer Mechanic Driver,Plumber	Machinist
25th Percentile	Plumber Farmer		Farmer Carpenter	Electrician		
	Carpenter			Machinist	Bricklayer	Farmer Plumber Bricklayer
				Mechanic		
	Driver			Carpenter Plumber Driver Bricklayer	Carpenter	Mechanic Carpenter
						Driver

OCCUPATIONS ON 12 MEASURES OF DEVELOPED ABILITIES

Creativity	Mechanical Reasoning	Visualization in Three Dimensions	Abstract Reasoning	Arithmetic Reasoning	Introductory Mathematics
					Physician
					Physicist Electrical Engineer
					Chemist
					High School Math Teacher
				Physicist	
	Electrical Engineer	Physicist		Physicist Chemist	
	Physicist	Electrical Engineer		Electrical Engineer	
Physicist Electrical Engineer Theater Arts	Theater Arts		Electrical Engineer		University Teacher
Biologist University Teacher			Physicist, Chemist Biologist Physician University Teacher	University Teacher	Biologist Lawyer
Chemist	Chemist			Lawyer	
Physician	Biologist	Theater Arts Chemist Biologist		High School Math. Teacher	Pharmacist
	Physician		High School Math. Teacher	Biologist Pharmacist Clergyman Theater Arts	
	Electronic Technician	Physician University Teacher	Lawyer, Theater Arts		CPA Programmer
Lawyer	University Teacher				Clergyman
	High School Math. Teacher	Electronic Technician High School Math. Teacher	Clergyman	CPA, Programmer	
Pharmacist Clergyman Business Management, Programmer		Draftsman	Pharmacist Business Management Programmer CPA	Business Management High School Teacher	Business Management High School Teacher Theater Arts
High School Math. Teacher Electronic Technician	Business Management Pharmacist Programmer Lawyer	Clergyman, Pharmacist Business Management, Carpenter Lawyer	Marketing Social Worker H.S. Social Studies Teacher		
Social Worker		Proprietor	Electronic Technician	Marketing Electronic Technician	Social Worker
Marketing High School Teacher	Clergyman Proprietor	Programmer	High School Teacher		
CPA H.S. Social Studies Teacher	CPA Draftsman	Music Teacher Machinist, CPA Marketing	Draftsman Computer Operator	H.S Social Studies Teacher	H.S. Social Studies Teacher Electronic Technician Marketing, Music Teacher
Proprietor	Marketing Machinist Social Worker, Music Teacher Farmer, Electrician High School Teacher Carpenter Salesman Supervisor Mechanic	High School Teacher, Electrician	Proprietor Music Teacher	Music Teacher Salesman Social Worker	
Computer Operator Music Teacher, Salesman		Social Worker	Salesman	Computer Operator	Computer Operator
Draftsman Supervisor		Supervisor, Salesman Computer Operator Bricklayer Mechanic Plumber	Carpenter	Proprietor	Salesman
Policeman Machinist	Computer Operator Bricklayer		Supervisor Electrician Printer, Machinist	Draftsman	Proprietor Supervisor, Draftsman
Electrician	Policeman Printer	Farmer, Policeman		Farmer	
Bricklayer Mechanic	Driver	H.S. Social Studies Teacher Printer Driver	Policeman	Machinist Supervisor, Printer Electrician Policeman, Bricklayer	
Farmer, Printer	H.S. Social Studies Teacher		Farmer		Policeman Electrician Farmer
Carpenter Plumber	Plumber		Plumber, Mechanic	Carpenter	Machinist
Driver			Bricklayer	Plumber Mechanic	Bricklayer, Printer
			Driver	Driver	Plumber
					Mechanic
					Carpenter
					Driver

RELATIVE STANDING OF FEMALES IN 24 DIFFERENT

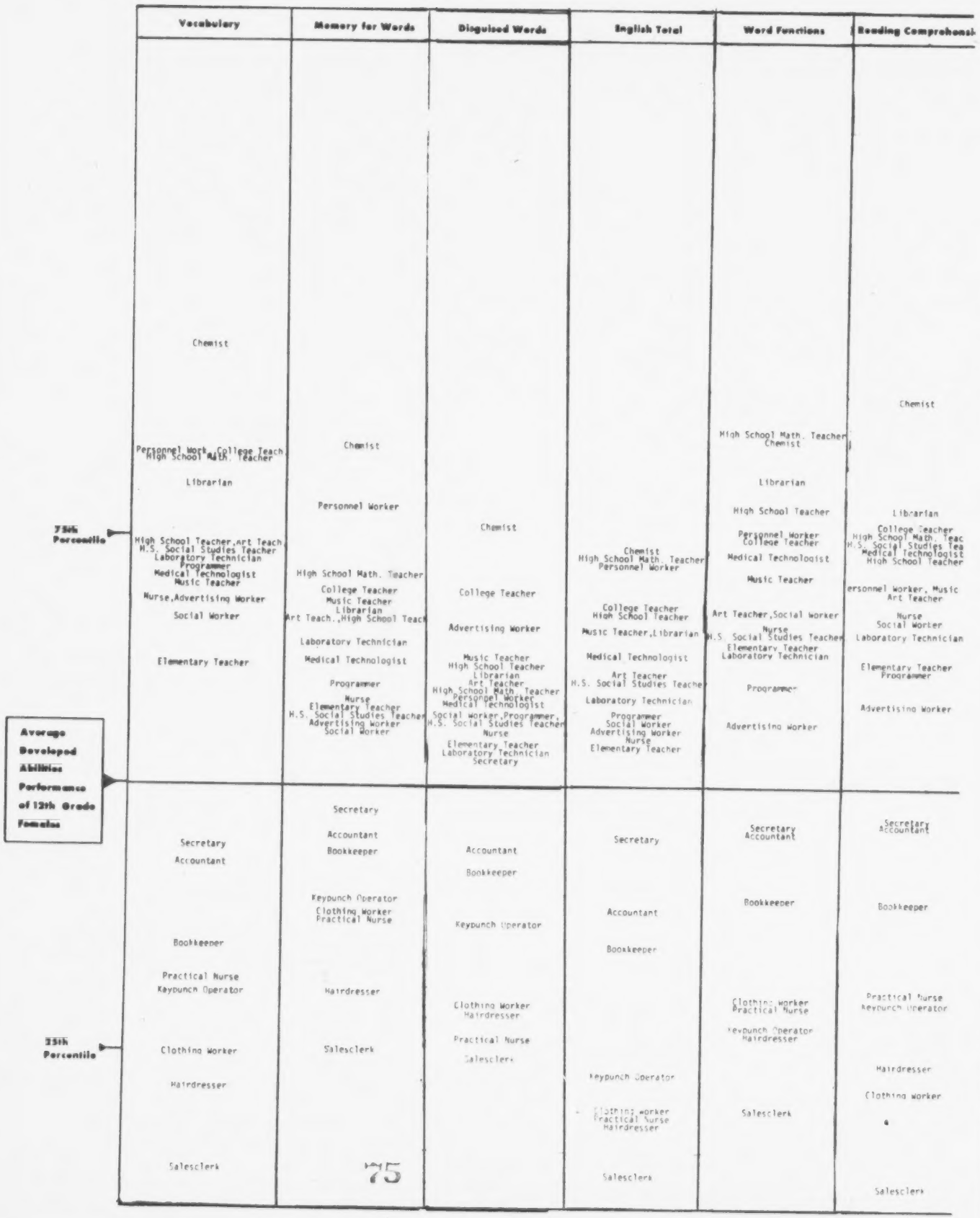


TABLE 3

OCCUPATIONS ON 12 MEASURES OF DEVELOPED ABILITIES

Creativity	Mechanical Reasoning	Visualization in Three Dimensions	Abstract Reasoning	Arithmetic Reasoning	Introductory Mathematics
					Chemist
					High School Math. Teacher
	Chemist			Chemist High School Math. Teacher	
	High School Math. Teacher				Programmer
		High School Math. Teacher			Laboratory Technician Personnel Worker Librarian, College Teacher Medical Technologist
		Chemist	High School Math. Teacher		
Chemist				Personnel Worker	High School Teacher
		Art Teacher		College Teacher	
	Art Teacher		Music Teacher Librarian Chemist	Librarian Programmer	
High School Math. Teacher Medic. Technologist, Programmer College Teacher	Programmer Medical Technologist College Teacher Laboratory Technician	Personnel Worker Music Teacher	Programmer	Medical Technologist, High School Teacher Music Teacher Laboratory Technician	Music Teacher Nurse
Librarian Advertising Worker, Music Tch. Personnel Worker, Art Teacher	Music Teacher Personnel Worker Librarian	Programmer College Teacher	College Teacher Laboratory Technician		Social Worker H.S. Social Studies Teacher Art Teacher
Laboratory Technician H.S. Social Studies Teacher, High School Teacher Nurse	Nurse	Librarian, Medical Technologist, Laboratory Technician	Art Teacher Medical Technologist High School Teacher	Social Worker Advertising Worker Nurse H.S. Social Studies Teacher	Elementary Teacher
		Nurse	Nurse Personnel Worker Elementary Teacher Social Worker, Advertising Worker H.S. Social Studies Teacher	Art Teacher Elementary Teacher	
Elementary Teacher	Advertising Worker High School Teacher Elementary Teacher H.S. Social Studies Teacher	Advertising Worker High School Teacher Elementary Teacher			
Social Worker	Social Worker	Social Worker Accountant H.S. Social Studies Teacher	Accountant	Accountant	Advertising Worker
Secretary Accountant Bookkeeper	Accountant Secretary Keypunch Operator Hairdresser Bookkeeper	Clothing Worker Bookkeeper, Secretary Hairdresser	Secretary Bookkeeper	Bookkeeper Secretary	Accountant
Keypunch Operator		Keypunch Operator, Practical Nurse	Keypunch Operator		Bookkeeper Secretary
Practical Nurse Hairdresser	Clothing Worker Practical Nurse		Hairdresser		Clothing Worker
Clothing Worker	Salesclerk		Clothing Worker Practical Nurse	Practical Nurse Hairdresser Keypunch Operator Clothing Worker	Practical Nurse Keypunch Operator
		Salesclerk			Hairdresser
Salesclerk			Salesclerk	Salesclerk	Salesclerk

TABLE 4

OCCUPATIONAL GOAL GROUPS

1. Engineering, Physical Science, Mathematics, and Architecture

Teacher, High School Mathematics
Teacher, High School Science
Teacher, College & University Science
Mathematician
Chemist
Engineer, Civil & Hydraulic
Engineer, Electrical & Electronic
Engineer, Chemical
Engineer
Architect
Physicist

2. Medical and Biological Sciences

Graduate Nurse (RN)
Physician
Dentist
Pharmacist
Biologist
Zoologist

3. Business Administration

Purchasing Agent
Personnel Administration
Finance Worker
Certified Public Accountant
Business Manager
Manufacturing Management
Marketing and Wholesale/Retail Trade Manager
Efficiency Expert, Industrial Engineer, Production Manager
Airplane Pilot
Military Officer
Teacher, High School Commercial Education
Retail Store Buyer
Advertising Worker
Accountant, Auditor, Comptroller
Other Workers in Industry, Business, and Commerce

4. General Teaching and Social Service

Teacher, Elementary School
Teacher, High School
Teacher, High School Physical Education
Teacher, High School Economics
Teacher for the Handicapped
Teacher (not elsewhere classified)
Social Worker
Clergyman

5. Humanities, Law, Social and Behavioral Sciences

Teacher, High School Social Studies
Teacher, High School English
Teacher, High School Foreign Language
Teacher, College & University Social Science
Teacher, College & University
Lawyer
Psychologist
Librarian

6. Fine Arts, Performing Arts

Teacher, Art (high school, elementary school, non-school)
Theater Worker
Teacher, Music (high school, elementary school, non-school)
Musician

7. Technical Jobs

Computer Programmer
Electronic Technician
Draftsman
Electronics Worker
Photographer
Laboratory Technicians & Research Assistants in Physical Science & Engineering
Medical Technologists
Laboratory Technicians in Medical & Biological Sciences

8. Business, Sales

Sales Clerk, Checker, Cashier
Insurance Salesman
Salesman (not elsewhere classified)
Sales Manager
Supervisor in Business
Proprietor, Contractor (in business for self)

9. Mechanics, Industrial Trades

Airplane Mechanic
Auto Mechanic
Mechanic
Appliance Repairman
Machinist
Electrician
Printing Tradesman
Machine Tradesman

10. Construction Trades

Carpenter
Bricklayer, Mason
Roofer, Painter, Plasterer
Plumber, Pipefitter
Miscellaneous Building & Construction Tradesman

11. Business, Secretarial-Clerical

Keypunch Operator
Computer Operator
Secretary
Bookkeeper
Bank Clerk
Receptionist & Other Public Contact Workers
Miscellaneous Clerical Workers
Stenographer
Court Reporter
Typist
Clerk
Legal Secretary
Miscellaneous Computing & Account Recording Workers

12. General, Community Service, Public Service

Auto, Bus, & Truck Driver
Policeman
Fireman
Farming
Farm & Ranch Owner
Hairdresser, Manicurist, Cosmetologist
Military Serviceman
Practical Nurse
Clothing & Fashion Tradesman
Industry, Business, Commerce
General Labor (unspecialized)

TABLE 5

CAREER CHOICE FOR MALES AT VARIOUS TIMES
CLASSIFIED IN TERMS OF THE OCCUPATIONAL GOAL GROUPS

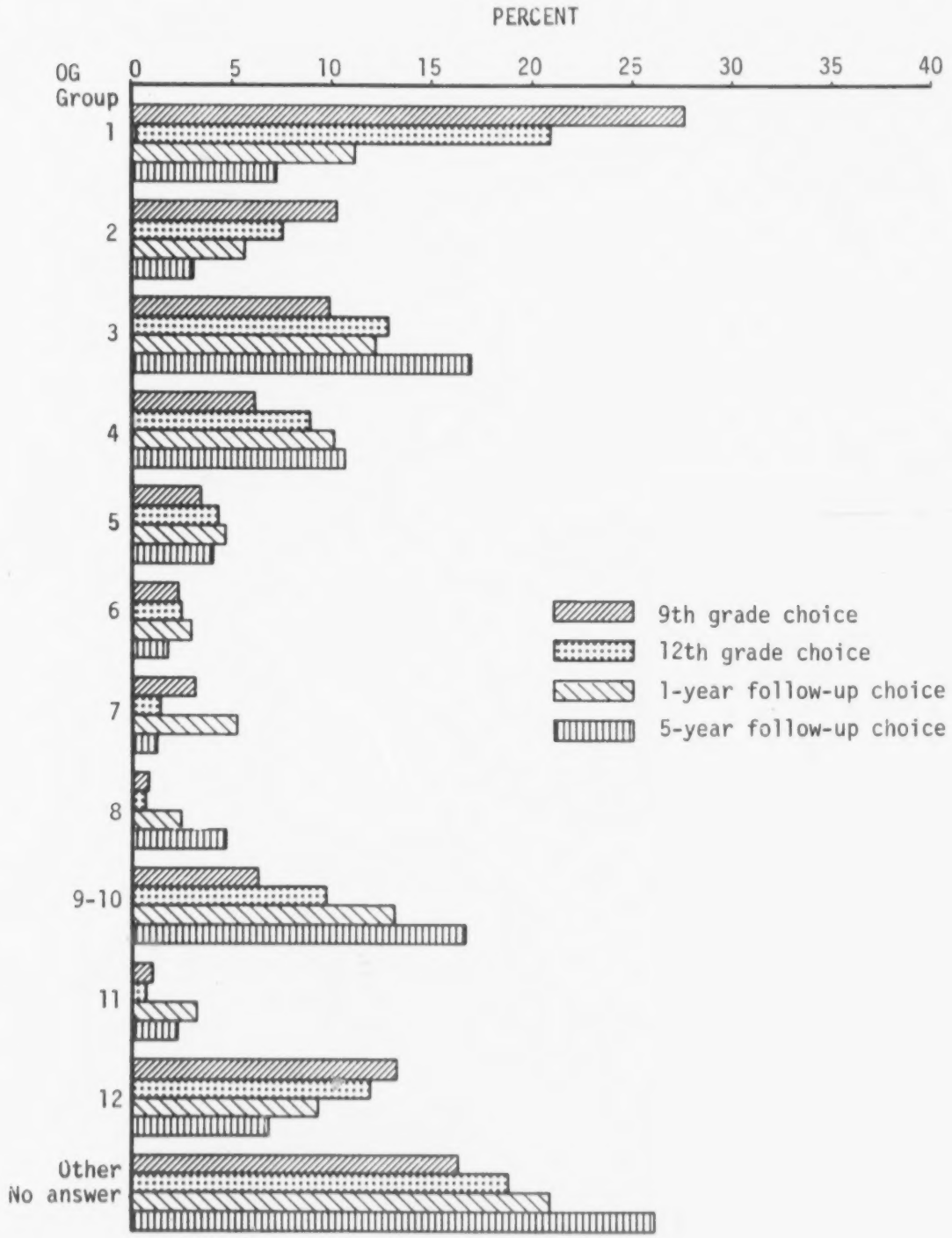


TABLE 6

CAREER CHOICE FOR FEMALES AT VARIOUS TIMES
CLASSIFIED IN TERMS OF THE OCCUPATIONAL GOAL GROUPS

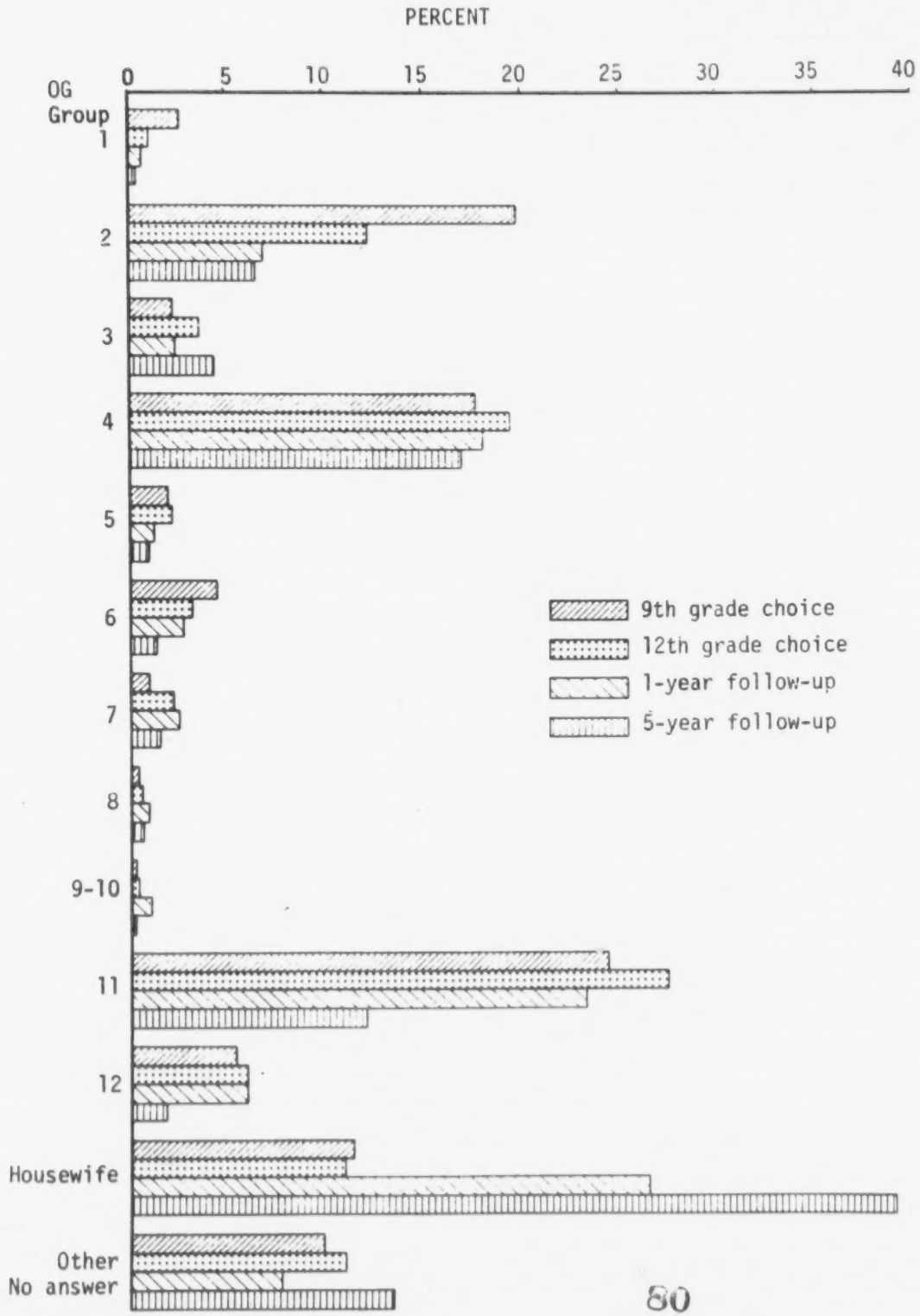


TABLE 7

STABILITY OF CAREER PLANS FOR MALES
CLASSIFIED IN TERMS OF OCCUPATIONAL GOAL GROUPS
IN THE TWELFTH GRADE AND AT THE TIME OF THE FIVE-YEAR FOLLOW-UP

5-YEAR FOLLOW-UP CAREER PLANS: OG Group	12TH GRADE CAREER PLANS: 1	2	3	4	5	6	7	8	9&10	11	12	Other	Overall
1	20.5	3.6	3.1	4.2	3.1	.6	.6	.4	5.4	.0	2.2	3.7	7.1
2	3.5	20.8	.7	3.5	.8	.4	14.2	1.3	.2	1.1	1.8	1.4	3.3
3	17.4	17.8	31.8	14.9	13.6	17.6	6.5	19.1	8.5	7.7	15.3	11.7	17.4
4	6.4	8.2	5.3	31.7	12.9	13.5	7.7	2.0	1.7	16.0	4.6	4.4	8.1
5	8.0	10.8	3.9	7.6	28.0	8.8	4.5	7.5	1.0	.6	1.5	2.1	6.2
6	1.3	.4	.6	2.4	4.0	20.1	1.9	.2	.3	.5	.8	2.7	1.9
7	.4	3.2	.1	.1	.2	.2	2.5	.8	.1	.0	.1	.1	.4
8	2.4	1.8	7.3	5.2	5.4	4.2	2.2	45.5	4.0	.5	7.7	3.0	4.7
9&10	14.7	6.6	13.4	8.3	11.3	4.2	26.5	5.4	40.5	4.4	13.8	23.8	16.7
11	.9	1.2	4.7	.5	.5	.6	.0	1.1	1.3	.6	3.3	2.7	2.1
12	3.3	3.0	4.8	2.2	.9	3.4	1.9	1.4	6.6	.3	18.5	10.4	6.2
Other	21.4	22.6	24.2	19.5	19.4	26.5	31.5	15.1	30.4	67.6	30.5	23.1	25.9

OVERALL STABILITY RATE = 27.9

All entries are percents of columns.

TABLE 8

STABILITY OF CAREER PLANS FOR FEMALES
CLASSIFIED IN TERMS OF OCCUPATIONAL GOAL GROUPS
IN THE TWELFTH GRADE AND AT THE TIME OF THE FIVE-YEAR FOLLOW-UP

5-YEAR FOLLOW-UP PLANS: OG Group	12TH GRADE CAREER PLANS: 1	2	3	4	5	6	7	8	9&10	11	12	Housewife	Other	Overall
1	19.4	.7	.1	.7	.6	.4	.2	.0	.0	.1	.1	.1	.2	.5
2	4.8	36.1	3.8	2.1	4.1	1.0	16.2	.5	.0	.6	2.1	4.9	2.7	6.6
3	10.5	1.3	13.2	3.1	2.3	8.0	1.5	4.2	.0	5.2	1.5	3.4	4.8	4.2
4	31.2	8.3	19.1	47.8	40.6	16.5	15.2	3.0	2.9	3.1	2.7	5.2	17.1	16.8
5	5.0	3.1	.4	1.6	9.3	2.2	1.4	.0	.0	.1	.1	.2	1.7	1.3
6	1.0	.3	.3	1.6	1.3	19.3	.3	.0	.0	.4	.1	.3	1.5	1.3
7	1.7	1.9	1.4	.7	3.4	1.5	13.6	1.0	.0	.4	1.6	.4	.6	1.2
8	.2	1.7	.1	.1	.4	.0	.0	7.6	.0	.7	.2	2.5	.8	.9
9&10	.2	.0	.1	.3	.0	.0	.0	.0	.0	.0	.1	.0	.6	.2
11	2.9	5.6	11.8	7.1	2.6	3.0	9.4	22.1	4.0	23.0	3.3	8.0	13.9	12.1
12	.0	.5	.3	.9	.1	.3	.5	13.0	.0	.6	22.8	1.6	.9	1.9
Housewife	11.0	28.5	37.3	24.3	24.3	29.6	31.8	40.4	58.4	49.6	45.9	60.3	33.5	38.6
Other	12.0	11.9	12.1	9.7	11.0	18.2	9.6	8.2	34.8	16.2	19.7	13.0	21.6	14.4

OVERALL STABILITY RATE = 32.0

All entries are precents of columns.

TABLE 9

PREDICTABILITY OF GROUPS PLANNING SPECIFIC CAREERS FIVE YEARS AFTER COMPLETING HIGH SCHOOL

CORRELATION COEFFICIENTS* BASED ON 11TH AND 12TH GRADE MALES
FOR 64 COGNITIVE VARIABLES, 45 NONCOGNITIVE VARIABLES, AND ALL 109 VARIABLES

OG GRP.		OCCUPATIONS	11TH GRADE MALES N	64 COGNITIVE VARIABLES	45 NONCOGNITIVE VARIABLES	109 COGNITIVE AND NONCOGNITIVE VARIABLES	12TH GRADE MALES N	64 COGNITIVE VARIABLES	45 NONCOGNITIVE VARIABLES	109 COGNITIVE AND NONCOGNITIVE VARIABLES
1.	211	MATH, STAT	42	.58	.54	.70	46	.58	.62	.72
	242	ELECTRICAL ENGINEER	234	.55	.55	.63	243	.59	.62	.69
	232	PHYSICIST	53	.66	.69	.80	64	.63	.56	.72
	250	ARCHITECT	64	.47	.54	.64	58	.51	.57	.69
2.	310	BIOLOGIST, ZOOLOGIST	48	.45	.50	.62	32	.54	.57	.71
	329	MD OTHER	186	.60	68	.77	229	.60	.75	.83
3.	716	CPA	167	.37	.47	.55	280	.35	.45	.50
	730	BUS MGMT/ADMIN (NEC)	514	.22	.23	.29	511	.20	.27	.32
4.	400	TEACHER (NEC)	478	.28	.32	.38	423	.33	.37	.44
	521	CLERGYMAN	177	.58	.70	.80	176	.58	.66	.78
5.	360	PSYCHOLOGIST	94	.46	.43	.65	106	.45	.52	.60
	393	LAWYER	342	.54	.59	.66	393	.48	.58	.63
6.	551	MUSICIAN	17	.76	.88	1.00**	24	.73	.82	1.00**
	545	COMM ARTIST	54	.54	.81	.90	48	.63	.78	.91
	575	THEATER (OTHER)	25	.66	.56	.81	23	.64	.64	.86
7.	811	ELECTRONIC TECHNICIAN	258	.38	.34	.44	212	.42	.38	.48
	864	DRAFTSMAN	134	.36	.41	.49	140	.38	.44	.52
8.	738	SUPERVISOR IN BUS	53	.41	.40	.54	87	.38	.34	.48
	748	OTHER SALESMAN (NEC)	327	.28	.33	.40	350	.26	.31	.36
9.	821	AUTO MECHANIC	112	.50	.54	.61	74	.52	.58	.68
	810	ELECTRICIAN	211	.35	.35	.42	168	.42	.44	.51
	828	MACHINIST	276	.39	.44	.50	176	.40	.44	.51
10.	837	CARPENTER	63	.52	.45	.59	55	.53	.50	.64
	835	PLUMBER, PIPEFTR	81	.46	.40	.55	72	.46	.42	.55
11.	797	MISC CLERICAL	108	.42	.34	.49	112	.38	.33	.46
12.	853	AUTO, BUS, TRUCK DRVR	91	.49	.51	.61	85	.56	.53	.66
	899	GENERAL LABORER	314	.46	.45	.52	277	.46	.46	.52

*These coefficients are corrected for the limitations imposed by variations in the numbers planning careers in specific occupations by obtaining the ratio of the point biserial multiple correlation coefficient to the maximum coefficient possible with a given dichotomy.

**Due to sampling fluctuations, some coefficients when corrected exceeded 1.00.

CAREER EDUCATION AND GUIDANCE IN THE PLAN SYSTEM OF INDIVIDUALIZED EDUCATION

*James A. Dunn**

PLAN: An Overview

PLAN represents one of the most comprehensive efforts yet taken toward the individualization of education. PLAN stands for A Program of Learning in Accordance with Needs and was the product of a cooperative effort between the American Institutes for Research, 14 public school systems, and the Westinghouse Learning Corporation.

In 1965 John C. Flanagan, President of AIR, initiated talks with the superintendents of a number of public school systems to explore the possibility of bringing as much power of psychology and educational technology as possible to bear on the task of making education more relevant to the needs of children. Fourteen school systems eventually entered into a cooperative relationship with AIR. The school systems and their respective superintendents are summarized in Figure 1.

In January of 1967 the group signed a contract with Westinghouse Learning Corporation for a 3-1/2 year developmental effort. The aggregate cost of the project, to be shared jointly by AIR, the school districts, and the Westinghouse Learning Corporation was eventually 10 million dollars.

Origin and goals of Project PLAN. PLAN had its origin in the findings of an undertaking called Project TALENT. Project TALENT was the largest national assessment of the abilities, interests, and aspirations of American youth ever undertaken. The TALENT sample tested in 1960 consisted of a nationally representative sample of over 400,000 high school youth. A follow-up testing of 12,722 was made in 1970.

TALENT dramatically confirmed the great variance in levels of ability that were manifested by students by the time they reached high school age. For example, approximately one out of every four 9th grade students was functioning

---

**James A. Dunn is the Director of Development Systems at the American Institutes for Research. Dr. Dunn was Director of the Curriculum, Guidance, and Individual Planning Divisions of Project PLAN.*

Figure 1

COOPERATING SCHOOL DISTRICTS AND ADMINISTRATORS

Archdiocese of San Francisco Rev. Pierre DuMaine San Francisco, California	Quincy Public Schools Robert E. Pruitt Quincy, Massachusetts
Bethel Park School District Theodore A. Siedle Bethel Park, Pennsylvania	San Carlos Elementary School District Albert R. Beardsley San Carlos, California
Fremont Unified School District William J. Bolt Fremont, California	San Jose City Unified School District George M. Downing San Jose, California
Hicksville Public School District Donald F. Abt Hicksville, New York	Santa Clara Unified School District Lawrence C. Curtis Santa Clara, California
Hughson Union High School* Robert Reeder Hughson, California	Sequoia Union High School District** George P. Chaffey Redwood City, California
Pittsburgh Public Schools Sidney P. Marland, Jr. Pittsburgh, Pennsylvania	Union Elementary School District Berkeley Matthews San Jose, California
Penn-Trafford School District Harry B. Gorton Harrison City, Pennsylvania	Wood County Schools Daniel B. Taylor Parkersburg, West Virginia

*Participated for one year

**Participated for two years

at the 12th grade level in English and Social Studies. On the other hand, a comparable number of students were functioning at only the 6th grade level.

If one looks at the functional meaning of 12th grade reading ability, i.e., what one can read or comprehend, however, one's perspective changes. Just how good is the reading comprehension of the average 12th grade student? While seventy-two percent of the 12th grade students could read and pass tests on their comprehension of the writing of Robert Louis Stevenson, only 45% could pass comprehension tests on sample Reader's Digest articles, and only 4% could comprehend Saturday Review articles. Only 25% were able to answer correctly half or more of the test items on typical paragraphs from Time magazine. "These results suggested that today's high school graduates are ill equipped to evaluate the evidence and make wise decisions in choices with respect to important national issues." (J.C. Flanagan, Education, Vol. 90, 3, pp. 192-205, 1970.)

TALENT also documented the great fluidity of students' vocational goals. On the average, of every 12 male high school seniors, only 2 still held the same general vocational aspiration 5 years later.

Clearly, ways needed to be found not only to individualize instruction but also to revamp that instruction, to make it more relevant to the needs of youth in our contemporary society. If schools were to assist students to eventually become responsible for their own personal development, they needed to help the student acquire, in addition to formal academic content: knowledge of available choices of occupational roles, leisure-time activities, social and civic responsibilities; knowledge of individual differences, the principles of learning, behavior management, and prospects for the development and/or changeability of interests and values; skills in the recognition and assessment of his own personal abilities, interests, and values; skills in personal goal formation and the assessment of the implications of those goals; and skills in managing his own personal progress toward them.

These, then, formed the overall ambition of Project PLAN. Specifically, the goal of PLAN was to develop a practical educational system which could assist schools to move toward those goals.

Conceptually, PLAN may be considered in terms of three major theoretical components. The first encompasses all those elements which might loosely be called Instructional Resources; that is, the total instructional capability inherent in PLAN. In addition to the 6,000 instructional objectives embedded in 2,600 teaching/learning units, this capability also involves 1,500 criterion

referenced performance tests, 133 PLAN achievement tests, and a variety of special guidance tests, teacher guides, test manuals, instructional booklets, and the like.

The second main component of PLAN is the Guidance System which is responsible for: helping define and configure the instructional resources available in PLAN; the creation of student guidance and career education programs; and the development and operation of the procedures for the generation of individualized instructional programs. These latter entities were called Programs of Study or POS's.

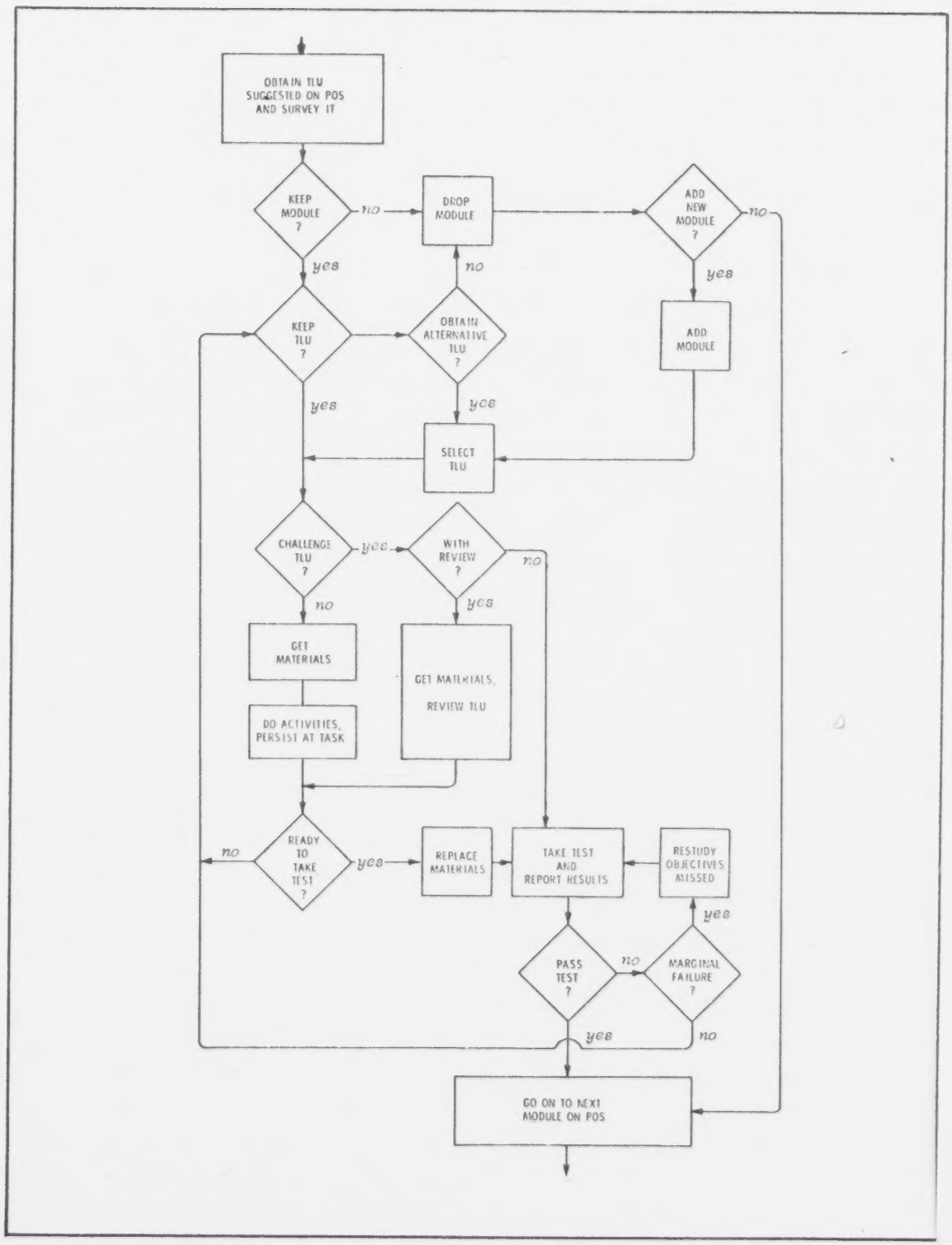
The third major component of PLAN comprises those Support Services essential for the implementation and continued operation of the program. These include information systems,computer services, teacher training, and materials procurement, production, and distribution.

Some of the basic terminology used in PLAN is summarized in Appendix A. In brief, the domain of instructional content in PLAN is defined by instructional objectives. There are three levels of objectives: (1) instructional objectives which generally take 2 to 3 hours of study time to master, (2) curricular objectives which subsume a number of instructional objectives and usually take 6 to 8 weeks to master, and (3) long-range objectives which may take a year or more to master. Examples of the three levels of this objectives hierarchy might be: (a) divide simple 2 digit numbers by 1 digit numbers (b) perform long division, and (c) master arithmetic operations with whole numbers.

Instructional objectives were grouped into units of study called modules. Materials were then developed to guide the student's study of these objectives. Three to four alternative units were developed for each module. These study units were called teaching/learning units. They provided for individualization of instructional method. End-of-module tests were developed to assess achievement of the module objectives. The same end-of-module test was used regardless of the particular TLU used because all TLU's for the same module were concerned with the same set of objectives. The student may take the module test whenever he and his teacher think he is ready. He need not complete all of the activities of the TLU if he thinks he can demonstrate mastery of the objectives. Figure 2 summarizes the module decision process.

Figure 2

THE STUDENT-MODULE INTERACTION LOOP



Modules were sometimes clustered together to form larger instructional blocks. These were called module clusters. Survey tests were used to assess retention of mastery across these larger sets of module objectives. Finally, at the end of the year, assessment was made of the student's final level of performance preparatory to placement for the coming year.

Scope of PLAN. The PLAN instructional system encompasses the full spectrum of basic academic education for grades 1-12. It includes five different reading programs as well as literature, composition, public speaking, grammar, listening skills, and the like in the language arts area. Science begins in grade 1 and includes, at the upper grade levels, earth science, chemistry, physics, and biology. Social Studies also begins in grade 1 and includes history, geography, and economics as well as basic elements of sociology, anthropology, psychology, and political science. Likewise, mathematics begins in grade 1 and runs through first year calculus.

By way of repetition, then, the instructional resources of PLAN involve 6,000 instructional objectives incorporated in 2,600 discrete teaching/learning units using 12,000 items of instructional material. There are 1,500 criterion referenced performance tests, 133 PLAN achievement tests, and special guidance tests based on the findings of Project TALENT.

This constitutes approximately 2 1/2 times as much material as would normally be studied by an average student during his 12 years of public school experience. Included in this content is the equivalent of 3 1/2 years of career education and guidance related study required of all students. (See Appendix B for a listing of the guidance and career education modules in PLAN).

Teachers are free to organize the classroom any way they choose; they are free to team teach, use differential staffing, and the like. The system does not require any personnel other than those the school would normally employ. Nor does it require any special organization or configuration of the classroom. Typically, however, teachers find it convenient to organize the classroom in an open classroom style with one area designated as a quiet area where students can study independently and take tests without fear of too much distraction.

The role of guidance in PLAN. It is the guidance component in PLAN that makes PLAN a system of truly individualized education rather than simply a program of individualized instruction. It is the guidance element of PLAN which attends

to the individualization of curriculum content as well as instructional method. PLAN guidance, however, goes much farther than that.

To the extent possible, guidance is treated as an integral component of the regular instructional programs. It is through the psychology strands of the social studies and science programs that the student learns about individual differences, his potential for development, study skills and test taking strategies, and the like. It is through the applied economics strand in social studies that he learns about the world of work, about life-styles associated with various careers, the educational requirements associated with various occupations, areas for potential social and civic contribution. It is in social studies that he also develops an awareness of his own personal interests, abilities, and values, and develops skills in personal planning and long-range goal formation.

He receives practice, in all academic areas, in assuming ever-increasing responsibility for self-direction. He begins this at the earliest stages by being responsible for obtaining and replacing instructional material he uses. Later he is involved in choice options with regard to what materials he will use, and still later, in regard to what modules he will study, when to challenge the modules, and when to reinforce skills he already possesses but may need improvement in vis-à-vis his long-range goal.

The balance of this paper will elaborate the PLAN Guidance System more fully.

Assumptions Underlying the PLAN Guidance System

Guidance has assumed several different emphases in schools over the years. The three major emphases have been: (1) the facilitation of normal growth and development in all or at least a majority of students; (2) the prevention of abnormal or atypical problem development in children (i.e., problem prevention); and (3) assuming problems have already developed, the differential diagnosis of those problems and the development of programs to ameliorate those problems.

All of these are, of course, necessary for a comprehensive guidance system. In its initial version PLAN Guidance was concerned primarily with the first of these. It was considered essential to assign first priority to the development of a guidance system which would accommodate all students in Project PLAN. Subsequent effort was to be directed to the development of new techniques to be applied differentially to selected children to either: (a) improve desirable behaviors, or (b) extinguish unwanted behavior.

To reiterate then, initial attention has been directed toward the creation of a component to serve the needs of all students rather than just a special few.

Several assumptions underlie the initial PLAN Guidance System.

a. Guidance should be, insofar as possible, an integral part of the regular academic program of a student and should contribute to his overall eudcational development;

b. schools should make a much more direct and concerted effort toward considering, and accommodating, parental wishes and aspirations for their children;

c. guidance, in an individualized education system, must be concerned not only with helping students to formulate and pursue long-range educational and vocational goals, but also with making the educational system responsive to the needs, interests, and abilities of students; and, finally,

d. a guidance program, to be effective, must be predicated on empirical evidence.

The guidance system that was developed to accommodate these assumptions was composed of a number of subcomponents, or programs. The balance of this paper will describe each of these elements in turn. It should be noted at this point, however, that the system I shall be describing is an articulated, interactive system, even though some rather artificial distinctions have had to be made in order to permit description ad seriatim.

Components of PLAN Career Education and Guidance

Curriculum Planning and Coordination

To the extent that PLAN was to be concerned with the individualization of content as well as instructional method, it was essential that guidance play a prominent role in the planning and coordination of the PLAN curriculum. After the general direction of PLAN's instructional program was defined by the teachers and AIR staff responsible for materials development, responsibility for smoothing the curriculum, adjusting it across grade levels, articulating it across subject matter areas, and indexing it for subsequent use in the development of individual programs of study, was transferred to the Guidance and Individual Planning group.

We were aided in this task by the services of panels of experts for each of the subject matter areas. The individuals serving on these panels are summarized in Figure 3.

Figure 3

NATIONAL CURRICULUM ADVISORY PANELS FOR PLAN

Mathematics:	
Dr. Howard Fehr	Columbia University Teachers College
Dr. Donovan Johnson	University of Minnesota
Dr. Burt Kaufman	Southern Illinois University
Dr. Hans Zassenhaus	Ohio State University
Science:	
Dr. Robert Gagné	Florida State University
Dr. Paul DeHart Hurd	Stanford University
Dr. Robert Karplus	University of California, Berkeley
Language Arts:	
Dr. Francis Christensen	University of Southern California
Dr. Julius Hook	University of Illinois
Dr. Walter Loban	University of California, Berkeley
Dr. Robert Ruddell	University of California, Berkeley
Dr. Ruth Strickland	University of Illinois
Social Studies:	
Dr. Richard Gross	Stanford University
Dr. John Haefner	University of Iowa
Dr. John Michaelis	University of California, Berkeley
Dr. Roy Price	Syracuse University

Furthermore, because PLAN was to incorporate guidance as an integral part of the academic program throughout grades 1-12, it was necessary for the guidance staff to work closely with the materials development staff in order that the vocational information program, the study skills program, and the other guidance programs could be appropriately integrated. See, for instance, row F on the Social Studies Curriculum Chart or row A on the Science Curriculum Charts, Appendix C.

The concept of guidance in PLAN is an entirely new approach to student guidance. As a consequence the AIR guidance group was also required to engage in curriculum development and the actual production of the instructional materials to be used. This was especially the case in the development of student long-range planning materials. In order to predicate these materials on the results possible from the TALENT five-year follow-up data, the guidance group was also involved in TALENT data analysis.

The Orientation and Study Skills Programs

With regard to student orientation, it was found from two years of field testing that extensive orientation efforts are quite unnecessary. Students very quickly learn the PLAN routine *in situ*. Thus, formal orientation efforts in PLAN are rather brief and focus on two efforts.

The first is an orientation of the student to what is expected of him in PLAN classrooms. PLAN classrooms are quite different. The new PLAN student needs to learn that in PLAN classrooms students rarely all do the same things at the same time; that each student works at his own speed; that tests are used differently in PLAN classes than in regular classes; that PLAN classes differ from traditional classes in the variety of books and instructional materials used; and that there is a high degree of personal responsibility expected of PLAN students, e.g., responsibility for obtaining and replacing instructional materials, for taking the initiative in a variety of learning activities, and the like. Indeed, the Employer-Based Career Education student will have to expect a great difference between career education and anything else like education they have ever experienced before.

Second, the student is oriented to the simple mechanics of PLAN Teaching/Learning Units (TLU's), how to challenge modules, how to read a Program of Study (POS), the persons responsible for the POS, when and how a POS should be changed, and the like.

With regard to study skills, modules deal with: (1) individual differences and their assessment; (2) strategies for test taking; (3) listening skills; and (4) study management skills. These materials are incorporated into students' individual programs as they become increasingly independent in those studies. This usually occurs during the middle of the elementary grades. These skills are then reinforced periodically throughout the balance of their school years. These modules are part of the Science and Language Arts offerings, and thus represent one aspect of the integration of guidance into the academic program indicated earlier. The basic psychology modules dealing with individual differences and their assessment, for example, are part of Science; listening and study skills are part of Language Arts. Figure 4 presents sample objectives of this program.

Figure 4

SAMPLE OBJECTIVES - STUDY SKILLS PROGRAM

You will be able to:

Classify individual traits into the following areas of human differences: physical appearance, physical ability, mental ability, interest, value, aspiration, and personal-social characteristics.

Choose which individual traits can be changed more easily than others and identify ways a given trait might be changed.

Define and identify different categories of tests.

Identify four important uses of test scores.

Apply the principles of prediction and probability as they are used in testing.

Identify factors influencing general test performance and ways of dealing with these factors.

Recognize effective strategies for dealing with subjective (essay) test questions.

Recognize and use effective strategies for dealing with objective test questions.

Identify 10 major principles of learning.

Identify (a) four study skills which help you to read with greater understanding and retention, and (b) at least five related principles of learning.

The Career and Vocational Information Program

Regarding the Career Information Program, it was clear that PLAN had to offer a significant alternative to Career Information Programs as they have been typically formulated in schools in the past. Although vocational information and vocational guidance were historically the earliest charges given school counselors, this function is one that has been more commonly honored in the breach than in the observance. For whatever reasons, there is typically only a small amount of time allotted to vocational guidance activities. The traditional practice has been to make occupation information "available to students" and to allow them to explore those occupations in which they think they might have a special interest. Unfortunately, however, youth know so little about occupations in general that their "explorations" are often little more than aimless browsing through vocational information materials. This is especially the case inasmuch as vocational aspirations typically had only the slightest bearing on what students did in school.

A much wider range of occupational opportunities are being opened to young people today. Indeed the Bureau of Labor Statistics estimates that individuals entering the labor force today can be expected to undergo an average of six to eight major job changes in their work life. Clearly students need far more information about occupation options than they receive via traditional channels. For maximum flexibility students need to develop a fair understanding of the entrance requirements, requisite skills, associated life styles, and opportunities for advancement associated with the major occupations which employ the bulk of this society's labor force.

A broad spectrum of career information is presented to the student in PLAN.

Information about educational and occupational opportunities, and about the world of work in general, is presented as an applied economics strand in PLAN Social Studies. This permits using occupational information in connection with such subjects as economic geography, ecology, urban problems, and industrial development. The program consists of 40 modules distributed across 12 grade levels. They are distributed in the following fashion:

Primary program. In the primary grades (1-4), most vocational information objectives are embedded in modules which give the young child a fairly simple, yet reasonable, introduction to the world of work. These objectives emphasize:

1. the nature and variety of work in some of the specific occupations that are usually visible to young students,
2. the patterns of interaction with other persons in job settings that differentiate work from other social roles,
3. work as a means of making a living and as a means of attaining personal satisfaction,
4. the roles that various occupations play in fulfilling social and economic needs, and
5. the general ways that people prepare for an occupation.

Samples of some of the primary level vocational information modules are presented in Appendix D.

Intermediate program. At the intermediate grades (5-8) approximately 15 learning units introduce the changing nature of trends in the American labor force, the concept of occupational families, and information about some 100 occupations grouped within major occupational families. In particular PLAN students study the groups that comprise the largest numbers of workers both male and female; those with the largest number of unemployed workers; the relationship between the occupations in greatest demand projected over the next ten years and the amount and kind of education required to enter them; and projected labor trends. The intent is to give the student an appreciation of the variety and complexity of occupations, the nature of the tasks assumed under these occupations, the type of training and preparation necessary, the style of life associated with each, and some concept of the contributions of these occupations to the fabric of American life.

Occupations are presented to PLAN students according to a system of broad occupational families. In the Five-Year Follow-Up of students tested in 1960, it was found that most of the career plans of the TALENT students five years after graduation from high school could be grouped empirically in twelve job-families. Six of these usually require college training and six do not.

The twelve occupational families used in Project PLAN were developed on the basis of educational requirements and the similarity of their interest and ability patterns as checked empirically using Project TALENT data. These twelve Long-Range Goal groups (LRG's) include approximately 100 occupations. The occupations in each of these sets were originally grouped on the basis of similar educational requirements and types of activities. The ability profile for each occupation was then compared both with those of the other occupations in the group to which it was tentatively assigned and also those in the eleven other groups.

The twelve career clusters and the occupations comprising them are summarized in Figure 5.

Figure 5

CAREER CLUSTERS AND THE OCCUPATIONS COMPRISING THEM

1. Engineering, Physical Science, Mathematics, and Architecture

Teacher, High School Mathematics
Teacher, High School Science
Teacher, College & University Science
Mathematician
Chemist
Engineer, Civil & Hydraulic
Engineer, Electrical & Electronic
Engineer, Chemical
Engineer
Architect
Physicist

2. Medical and Biological Sciences

Graduate Nurse (RN)
Physician
Dentist
Pharmacist
Biologist
Zoologist

3. Business Administration

Purchasing Agent
Personnel Administration
Finance Worker
Certified Public Accountant
Business Manager
Manufacturing Management
Marketing and Wholesale/Retail Trade Manager
Efficiency Expert, Industrial Engineer, Production Manager
Airplane Pilot
Military Officer
Teacher, High School Commercial Education
Retail Store Buyer
Advertising Worker
Accountant, Auditor, Comptroller
Other Workers in Industry, Business, and Commerce

4. General Teaching and Social Service

Teacher, Elementary School
Teacher, High School
Teacher, High School Physical Education
Teacher, High School Economics
Teacher for the Handicapped
Teacher (not elsewhere classified)
Social Worker
Clergyman

5. Humanities, Law, Social and Behavioral Sciences

Teacher, High School Social Studies
Teacher, High School English
Teacher, High School Foreign Language
Teacher, College & University Social Science
Teacher, College & University
Lawyer
Psychologist
Librarian

6. Fine Arts, Performing Arts

Teacher, Art (High School, Elementary School, Non-School)
Theater Worker
Teacher, Music (High School, Elementary School, Non-School)
Musician

7. Technical Jobs

Computer Programmer
Electronic Technician
Draftsman
Electronics Worker
Photographer
Laboratory Technicians & Research Assistants in Physical Science & Engineering
Medical Technologists
Laboratory Technicians in Medical & Biological Sciences

8. Business, Sales

Salesclerk, Checker, Cashier
Insurance Salesman
Salesman (not elsewhere classified)
Sales Manager
Supervisor in Business
Proprietor, Contractor (in business for self)

9. Mechanics, Industrial Trades

Airplane Mechanic
Auto Mechanic
Mechanic
Appliance Repairman
Machinist
Electrician
Printing Tradesman
Machine Tradesman

10. Construction Trades

Carpenter
Bricklayer, Mason
Roofer, Painter, Plasterer
Plumber, Pipefitter
Miscellaneous Building & Construction Tradesman

11. Business, Secretarial-Clerical

Keypunch Operator
Computer Operator
Secretary
Bookkeeper
Bank Clerk
Receptionist & Other Public Contact Workers
Miscellaneous Clerical Workers
Stenographer
Court Reporter
Typist
Clerk
Legal Secretary
Miscellaneous Computing & Account Recording Workers

12. General, Community Service, Public Service

Auto, Bus, & Truck Driver
Policeman
Fireman
Farming
Farm and Ranch Owner
Hairdresser, Manicurist, Cosmetologist
Military Serviceman
Practical Nurse
Clothing and Fashion Tradesman
Industry, Business, Commerce (not elsewhere classified)

There are several advantages to presenting clusters of related occupations in an occupational education curriculum. First, when a PLAN student learns about an occupation that is representative of a particular occupational family, he is learning generalizations that apply to a number of other related occupations within the family. For example, when a student learns about the educational and training requirements for a mechanical engineer, the information probably would apply to numerous other kinds of engineers. Second, when a student begins to plan toward a general occupational goal, he is meeting requirement for a number of related occupations as well, any one of which may eventually become a primary goal contingent upon a minor change in his plans. A student might, for example, set a goal to become a medical doctor. This goal would require certain educational decisions starting him off on many years of college and professional training. If along the way he decided to alter his goal of becoming a medical doctor, his chances would still be very good for finding a satisfying occupation in a related field, such as the life sciences. Learning about families of occupations permits flexible and alternate planning on the part of students.

Although the occupations that are sorted into each of the 12 families have some similar characteristics, the same occupations can differ in a variety of ways. PLAN students will learn how to compare occupations across families according to such variables as major tasks performed on the job, working conditions, educational requirements, the various training paths, pay and personal and social consequences.

Secondary program. The secondary level occupational education program continues on in this same vein with an additional 13 modules and also stresses exploratory activities leading to modification of individual long-range goals, if necessary, and to the formulation of specific individual plans following high school.

Activities include such techniques and means of information-seeking as: (1) observing occupational films, film-loops and film strips; (2) reading occupational texts, pamphlets, work simulation kits; (3) listening to audio tapes and visitors who describe occupations and their reactions to various jobs in those occupations; (4) talking to teachers, counselors and visiting speakers; and (5) writing letters to admissions offices at colleges and/or training schools.

Such exploration, however, is not limited to the classroom. Secondary level PLAN learning units encourage them to engage in exploratory activities outside their schools such as: (1) visiting places of employment to observe workers on their jobs and to question them about their reactions to the work; as well as (2) visiting college campuses and/or vocational training schools in order to investigate the capacity of each option to furnish results relevant to each individual's goals; (3) looking into work-study opportunities; (4) interviewing for part-time or summer jobs that relate to their occupational goals; and (5) investigating part-time non-paying work opportunities that would enable them to gain direct experience in occupational roles.

Optional learning units are also available on occupations that are just beginning to be visible in the world of work, that is, occupations so new that standard governmental, industrial, and commercial sources have not yet included them in their publications. Secondary level PLAN students have opportunities to learn how such developments as space explorations and the ever-expanding uses made of computers will create new occupations in the 1970's and 1980's.

Examples of some of the objectives on typical learning units of this program may be seen in Figure 6.

The Student Goal Formulation Program

The third component of the PLAN Guidance System is the student goal formulation program. The purpose of the student long-range goal (LRG) formulation strand is to improve a student's long-range goal formulation skills so that he can arrive at decisions on the basis of informed choice. The paradigm being followed is given in Figure 7.

The student-parent long-range goal formulation effort consists of a series of 11 modules which the student takes in cooperation with his parents (typically as an out-of-school activity). This series results in the student and his parents jointly arriving at, and specifying, the educational and general vocational aspirations and goals they hold. The information obtained is then used as input data for the generation of the student's individualized program of studies. The following is a description of this series of modules.

The first two modules deal with decision-making, the consequences of decision-making, the times when certain kinds of decisions typically ought to be made, and the consequences should those decisions be arrived at too early or too late. The modules are entitled "Introduction to Decision-Making" and "Choices and Consequences."

Figure 6

SAMPLE OBJECTIVES OF THE CAREER AND VOCATIONAL INFORMATION PROGRAM

You will be able to:

Identify four trends in the world of work that are affecting workers and jobs.

Tell how industry (manufacturing, agriculture, and services) influences population distribution in your state.

List three services that an insurance salesman provides for his clients.

Describe what the employment prospects are for mathematical and physical science occupations.

Describe problems of particular concern to people who are directly involved in making a living in the developed and undeveloped grassland areas.

List two factors that a recent graduate of a college of dentistry would consider in setting up a dental office.

Describe the work activities of pharmacists employed in drugstores, in hospitals, and as drug salesmen.

Compare the length of training required and the average salary for a licensed practical nurse with the length of training required and the average salary for a professional nurse.

Describe the usual methods of obtaining training in the building trades and the employment opportunities in building trades.

Describe the main duties of carpenters, painters, plumbers, bricklayers, construction-machinery operators, and construction electricians.

Describe the commission and the salaried forms of income and compare the two.

Identify two financial benefits (other than pay) that workers usually recieve for doing their jobs.

Explain two non-monetary benefits that workers often receive for doing their jobs.

Identify five ways to describe jobs: (1) activities done on the job; (2) work setting; (3) pay and other benefits; (4) amount of education needed to get the job; and (5) chances of getting the job.

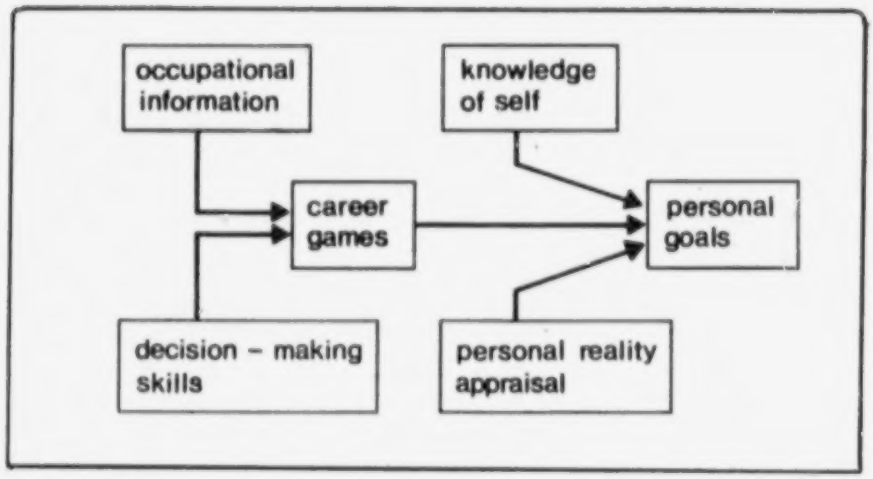
Describe several jobs that would probably be satisfying to a person based on a description of what that person wants in a job.

Identify five kinds of information used in comparing jobs: (1) duties of the job, (2) entry requirements, (3) working conditions, (4) amount and kind of benefits received, (5) opportunities for employment on the job.

Group jobs according to elements that the jobs have in common.

List five factors that people consider in choosing a job.

Figure 7
LRG FORMULATION



These two modules are then followed by a series of five modules dealing with a rather detailed analysis of the 12 LRG families suggested by the TALENT data, a description of the characteristics of prototype jobs comprising those LRG's, and a fairly detailed analysis of the skills and abilities characteristic of students going into the occupations representing those LRG's. These five modules utilize a series of four 30-page booklets that are based largely on the analysis of TALENT data, statistics from the Bureau of Labor Statistics, and such sources as the Occupational Outlook Handbook.

These modules are followed by two career planning modules in which the student gets practice in decision-making and planning for hypothetical individuals.

The career planning exercises are then followed by a module dealing with personal interests and values to be considered in making tentative LRG choices.

The personal assessment program has, to date, focused primarily on the development of interest and ability measures which form the foundation for student-parent long-range goal planning. Three instruments have been developed and are currently in use: an 18 scale Developed Abilities Performance Test, a 30 scale General Information Test, and a 12 scale PLAN Interest Inventory.

The data from these measures are used by the PLAN system, as well as by the individual student and his parents. In the former case, the data are used in the generation of data-suggested long-range goal categories. In the latter case the individual student uses data on his own personal abilities and interests in the formulation of his own long-range goals. Both the data-suggested goal category and the student-selected goal category are employed in individualizing the student's educational experiences.

In the final module the student and his parents apply what they have learned in the previous ten modules to arrive at the selection of tentative long-range goals.

This LRG information then becomes part of the input system for POS (Program of Studies) generation.

In addition to simply accepting student-parent long-range goal formulation indiscriminately it was recognized that, for a variety of reasons, student-parent long-range goal planning might not in fact protect the best interests of the student. For example, a student might be unduly influenced by the choice of significant members of his peer group at some point in time; similarly, he or his parents may be unduly biased by particular events in their own recent history. Some students may simply be derelict in conscientiously pursuing the student-parent long-range goal formulation materials and, of course, the materials themselves might not be effective in developing goal formulation and planning skills the first time they are used. Thus, as a backup procedure, a tentative long-range goal was assigned to the student as a reserve LRG, purely on the basis of the data, as they were available in the PLAN system. It was felt that by always attempting to accommodate the contemporary wishes of the student and his parents as well as the best prognostication we could make on a statistical basis, we provided the student with a certain measure of insurance for future flexibility. Indeed, we found that approximately 16% of the students appeared to opt for programs materially below their demonstrated level of ability. In these cases educational options were kept open for these students through the use of this auxiliary or data-suggested LRG.

Examples of objectives of the goal formulation program are found in Figure 8. Excerpts from sample learning units may be found in Appendix E.

Figure 8

SAMPLE OBJECTIVES - STUDENT GOAL FORMULATION PROGRAM

Describe how a person's life style may be affected by his job.

Identify the more important educational and occupational decisions to be made by students and the optimum times for making them.

Recognize that decisions are tentative and subject to change because:

a) your interests and abilities change,
b) the world changes, and
c) you might change your mind because you reassess the implications of your earlier decision.

Given descriptions of students making decisions, recognize examples of decisions which have been made carefully and identify four steps used in careful decision-making.

Given a description of a student and of a decision that he made, describe the most probable consequences of that decision for the student.

Given a description of a decision that a student has made relating to his educational and occupational future, identify additional factors that the student ought to have considered in making his decision.

Given certain undesirable consequences of a decision that a student has made, make a new decision for that student that will probably have more desirable consequences.

You will be able to identify several jobs that would probably be satisfying to a person based on a description of what that person wants in a job.

Given a decision that a student has made relating to his future, describe how this decision allows increased or decreased flexibility in planning and in the options it provides for the student.

Recognize that some decisions allow you more flexibility to modify your plans than others.

Given a "want-ad" description of a specific job, recognize whether that job belongs to LRG III: Business Administration, LRG VIII: Business, Sales, or LRG XI: Secretarial, Clerical.

Compare and contrast jobs in LRG IX: Mechanics, Industrial Trades, and in LRG X: Construction Trades, in terms of (a) nature of the work, (b) education and training requirements, and (c) DAP profiles.

Given a description of a decision made by a student and of the consequences of that decision, identify an alternative decision that could have been made and tell why you think it might also have been a good decision.

Given a description of a student, make a decision for that student which will allow him the most flexibility to do the things he wants to do.

Interpret your DAP scores and draw your DAP profile.

Relate your developed abilities to those of workers in various occupations and LRG's.

Evaluate the implication of your Long Range Goal selection in terms of your current educational plans.

The Individual Planning Program

The key component of PLAN Guidance is the Program of Studies. Individualization has long been a goal of education. Many attempts have been made in this direction over the last 100 years. Perhaps Washburne's efforts in Winnetka, Illinois have been the best known. These have been reported again in a recent book by Washburne and Sidney Marland, who was superintendent of the Winnetka public schools some years after Washburne's retirement.

In spite of an almost perennial concern for individualization, education just doesn't seem to have moved very far in the direction of effectively individualizing education. Wilhelms in the 1962 NSSE yearbook, Individualizing Instruction, after an extensive review of the major educational programs laying claim to accommodating individual differences, concluded that "there has been far too much tendency to individualize with respect to little more than rate of progress . . . and one must have a meager conception of individualization to settle for students merely being able to do the same things at a different pace." More recently, as of 1970, the USOE ERIC Documentation Center System carried over 1,900 references from recent years dealing with curriculum. Only 36 have anything whatsoever to do with individualized curricula, individualized programs of study, individualized education, or the like. And of these 36, approximately half dealt only with some form of programmed instruction.

Alvin Toffler in Future Shock, however, suggests we may be much closer to great variation in education than we think.

It is through the program of studies (POS) that PLAN hopes to individualize more fully a student's education. The POS attempts to individualize content and instructional method as well as quota and length of exposure time.

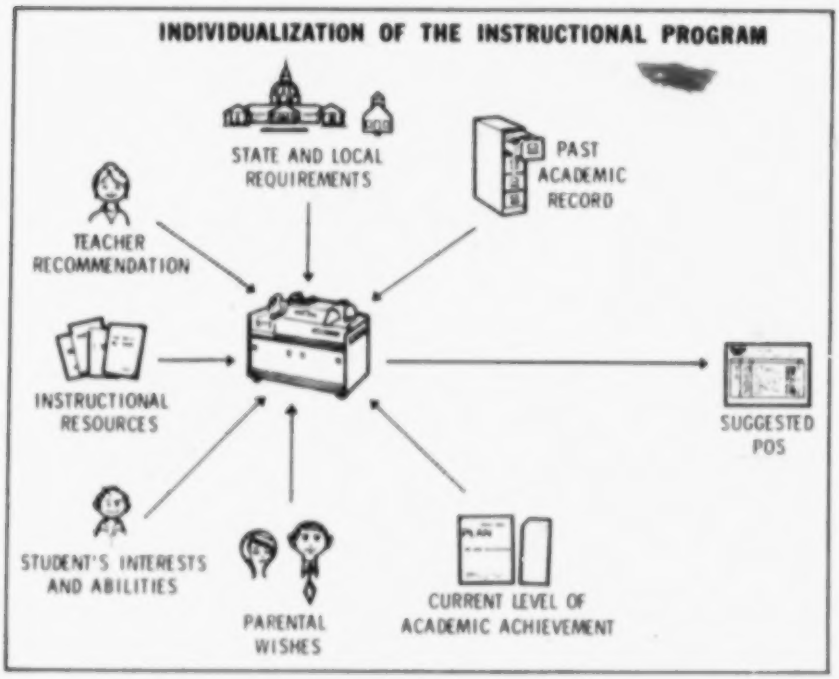
In particular, the POS considers:

1. What the student needs to know;
2. What the student already knows;
3. What the student would like to know;
4. The rate at which the selected content should be presented;
5. The sequence in which the content should be presented;
6. The mode of presentation of that content;
7. The difficulty level of the learning materials used to teach the content;
8. The nature of the physical and social context in which the teaching/learning takes place;

9. The amount of teacher supervision, media-richness, and technology involved;
10. Student-parent long-range goals and aspirations; and
11. The student's level of developed abilities.

Figure 9 summarizes the various sources of input to the PLAN POS.

Figure 9



A secondary school student's Recommended Program of Studies is produced as follows: first, information as to the student's long-range goal aspirations is retrieved. This information is the output of the Goal Formulation Program just described.

Next, data with regard to the student's interests, achievement levels, and developed abilities are obtained from the Expressed Interests Inventory and the PLAN Achievement and the Developed Abilities Performance Tests. From information about the student's developed abilities, a second long-range vocational goal was generated for the student, using TALENT based regression equations. This "data-suggested" LRG is used to supplement the parent-student planning so as to have an alternative option open for the student. The student's two long-

range goal (LRG) categories plus his expressed interests then play the major role in determining what content will be recommended for him.

Next, information regarding any special state or local school system requirements is retrieved. At this point the computer is ready to search out those modules considered most important for the student to take. To do this the computer must search among 70,000 module descriptor codes in its decision-making process.

The individualization of content--module selection. Given information about a student's long range goals, his expressed interests, citizenship requirements, and state and local school requirements, the computer generates a list of recommended modules arranged in the following order: (1) state requirements; (2) local requirements; (3) essential citizenship requirements; (4) parent-student long-range goal requirements; (5) parent-student long-range goal highly desirable modules; (6) computer recommended LRG requirements; and (7) computer recommended LRG highly desired experiences. Depending on the student's LRG pattern, this list may represent from 3 to 5 years' worth of work.

The student's past history is then searched to see what he has already mastered and to see if he has the necessary academic foundations to pursue the work that will be expected of him in the coming year. Next, the student's achievement test results are considered to see if there is anything from last year's material that needs to be reviewed and what, if anything, from the coming year's work he may already know. These procedures define what might be described as the core content of the student's future POS.

These core requirements are then projected across the time remaining for the student to study that particular area. If the student's POS called for less than 3 years of mathematics, the length of time allotted to mathematics would depend on his past performance rate in mathematics, unless there was a scheduling limit placed on the planning by the student. If on the other hand, his POS called for more study than time permitted, if, say, it recommended 4 years of mathematics as desirable for the student, given his LRG pattern, and there were only 3 years remaining, the POS would design a "heavy load" program for the student, explain why it was so heavy, and advise him that if he wishes to pursue his LRG to his best advantage, he should either (a) revise upward the total number of years he expects to spend studying in that area; or if that is impossible, (b) increase the amount of time and effort he will devote to the study of that subject in the time he has left.

Figure 10 gives several examples of POS messages.

Figure 10

SAMPLE POS MESSAGES

Take Placement Test 91-052. On the basis of the results of this test you will be placed into either the Sullivan, Miami, or Chandler Reading Programs, or into Placement Test 91-053 with subsequent assignment into the Harper-Row Reading Program.

Take all the modules in any _____ of the following _____ groups. Once you begin work on a module in one group, complete all modules in that group before going on to another group.

After completing the following group of modules, take PLAN Achievement Test_____.

There are two approaches to the study of World History available in PLAN. You may study from selected themes of history or you may study from a chronological approach. Chose one of the following two sets of modules. Set 48-017 structures history thematically. Set 48-018 structures it chronologically.

When you complete this module you will have completed your basic mathematics program. If you wish to go further in mathematics, please consult your teacher about developing your abilities further in geometry. This may be done either by taking modules dealing with areas, similarity and circles (modules 23-649 through 23-654 in the sequence which you have been studying) or by taking modules 20-543 and 20-548 through 20-551 which deal with constructions, indirect measurement, and trigonometry. The latter set of modules does not require proofs of theorems.

If you find some advanced algebra modules listed after the basic trigonometry modules, please take them in that order. These advanced algebra modules are as important as the trigonometry modules for the achievement of your long-range goal.

Modules 26-870 and 26-884 do not deal with calculus. However, they cover topics that appear on the CEEB Advanced Placement Examination in Mathematics. Module 26-870 is particularly important as a prerequisite to the study of calculus.

Your test results suggest that you know some of the objectives of these modules in your program of studies. After reviewing each module carefully, consider challenging it.

Your test results show that you should review the objectives of these modules which you completed last year. Do not submit status or test cards for them.

You should have the equivalent of four years of high school science for the new LRG you have selected. You have already completed the equivalent of one year. Your science POS this year and next will suggest a heavier than normal load in order for you to complete your science requirement in the two years you still have left before graduation. You may wish to discuss this problem with your counselor and/or social studies teacher to see about a corresponding reduction in your social studies POS.

After the basic or core requirements are identified and distributed across the balance of the time expected to be devoted to the study of that content, attention is then turned to determining how much of the requisite material should be taken in the immediately ensuing year. If n is the number of years remaining to study in an area, then the student is assigned at least 1/n of the required modules. Typically the core requirements constitute much less than a year's worth of study, so attention must shift to the assignment of modules to augment these basic core modules. To do this, consideration must be given to determining what is a reasonable amount of work for the student to cover in a year.

This is determined by taking into consideration both the student's level of developed abilities, as determined by a battery of tests administered in the spring, and also the number of modules the student completed the preceding year.

In the event that a student's quota is not filled by the 1/n requirement (an almost guaranteed condition), the POS then begins to assign lessons that are considered highly desirable for the student to take. These are lessons not considered to be absolutely essential for further academic progress but which are nevertheless considered to be very important basic content for the student to learn.

If upon completion of assignment of these highly desirable lessons the student's quota for the year is still not filled, the remainder of the quota is divided evenly between lessons expected to appeal to the special interests of the student and required modules from the next higher level. Assignment of modules of this latter type permits some measure of student acceleration without sacrificing curriculum enrichment.

After module selection and quota determination, attention is then directed to module sequencing. Many modules are, of course, sequenced by the logical development of the content. Mathematics is a good case in point; but even in mathematics, there are units of material which need not follow a rigid sequence within the year. Indeed, in the areas of social studies and literature a great deal may be studied sequence free. All modules in the system are coded as to their sequence characteristics; and indeed, some modules are coded to be collaterally sequenced across subject matter areas. The correlation of the study of the metric system in mathematics and measurement in science is an example.

Individualization of method--TLU selection. At this point, specific TLU assignment takes place. Up to now the only consideration has been identification of the content to be studied, i.e., which lessons, how many lessons, and in what sequence the lessons should be taken. Now we are faced with the question of learning style, i.e., what particular TLU's the student should take to study the assigned lessons so as to maximize the likelihood of his mastering the content as quickly as possible. It is at this point that the computer matches the student with specific TLU's.

The results of these computer-generated decisions are then printed as a formal Program of Study for the student (see Figure 11). It is printed in two copies, one for school record keeping, and the other for teacher-student classroom use. Appendix F shows several additional samples of POS's in order that variations in POS's may be compared.

Each teaching-learning unit was coded as to its reading difficulty, the degree to which it required teacher supervision, its media richness characteristic, the degree to which it required social involvement and/or group learning activities, the amount of reading involved, and the variety of activities inherent in the unit. Related data regarding the student is obtained from data inputs from the teacher and student test results.

The POS module assignment and TLU matching rules are not best-fit rules, however, since one wants a student's program to stretch the student a little, to broaden his interests and strain his intellectual ability a little, and lead him a little further down the educational road than he might ordinarily go. Best fit is called for in only an arbitrary percentage of the time, e.g., ninety percent. One of the big unanswered questions is what this value should be. From need-achievement/fear-of-failure research, and other motivation research, it would seem this should be variable for different individuals. And in time, given experience with POS operation, I am sure this will be individualized as well as any of the other factors.

POS modifiability. The student can add or delete modules to the POS with considerable ease; and if he chooses, even totally revise the recommended Program of Studies. A formal change in the POS can be made by simply indicating the number of the module he would like to delete or add. Barring this, he can even effect a change in the POS by simply studying a module or TLU not on his POS. Then, when the student's test card is filed with the computer, the computer notes that the module or TLU is different from any on the student's recommended POS and asks the student to verify that a coding mistake on the

Figure 11

SAMPLE PROGRAM OF STUDIES

PLAN

PROGRAM OF STUDIES 3266 EDWARDS BYRON

305 IMMACULATE HEART LEVEL 8 LANGUAGE ARTS FALL 1970

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO OF TIMES TO BE TAKEN	DATE STARTED	DATE FINISHED
		THE FOLLOWING MODULES ARE SUGGESTED FOR YOUR PROGRAM OF STUDIES FOR THIS YEAR.			
	99-301	PLAN ORIENTATION			
	99-302	PLAN PROGRAM OF STUDIES			
	11-306-2	FABLES AND LEGENDS			
	13-306	INDEPENDENT READING--ANIMALS			
	11-307-3	FACTUAL INFORMATION, SUFFIXES			
	13-307	INDEPENDENT READING--ADVENTURE			
	11-308-2	UNCOMMON WORDS, CLASSIFICATION OF LITERATURE			
	13-308	INDEPENDENT READING--SPORTS			
	11-309-3	FACT OR FICTION, MAIN IDEAS			
	13-312	INDEPENDENT READING--HUMOR			
	11-311-3	FACT AND OPINION, SHORT NOVEL REPORT			
	13-313	INDEPENDENT READING--SCIENCE FICITON			
	11-312-3	SUMMARIZING, SYNONYMS AND ANTONYMS			
	13-314	INDEPENDENT READING--BIOGRAPHY			
	11-313-3	CHARACTERIZATION, WORD MEANING, ORAL READING			
	13-315	INDEPENDENT READING--HISTORICAL FICTION			
	11-314-2	SKIMMING, FACTUAL INFORMATION			
	13-251-2	QUESTION TRANSFORMATIONS			
	13-252-2	DERIVATIONAL SUFFIXES			
	13-253-2	ADVERBIALS--NEGATIVE TRANSFORMATION			
	11-315-3	MAIN IDEA AND SUPPORTING DETAILS,AUTHOR'S USE OF WORDS			
SET	17-047 REFERENCE				
		TAKE ANY 1 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET; ASK YOUR TEACHER TO START SET NUMBER 17-047.			
	13-351-1	THE WRITING OF POETRY			
	13-352-1	READING THE NEWSPAPER			
	11-316-2	SEQUENCING, DRAWING CONCLUSIONS AND CHARACTERIZATION			
	11-351-2	REFERENCE SKILLS			
	21-300	PLAN ACHIEVEMENT TEST			
	11-352-2	NOTE TAKING,OUTLINING AND REPORT WRITING			

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO OF TIMES TO BE TAKEN	DATE STARTED	DATE FINISHED
SET	17-048 ANALYSIS				
		TAKE ANY 2 OF THE FOLLOWING 3 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET; ASK YOUR TEACHER TO START SET NUMBER 17-048.			
	11-353-2	MYSTERY STORIES 1--THE MYSTERIOUS SCHOOLMASTER			
	11-317-3	CRITICAL READING, ANALYZING A PLAY			
	11-318-2	POETRY--IMAGES,SOUND,AND MOOD			
SET	17-050 PLAYS				
		TAKE ANY 1 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET; ASK YOUR TEACHER TO START SET NUMBER 17-050.			
	10-382-2	PLAYS			
	10-383-1	STREETS AND STAGES			
	13-284-2	RELATIVE CLAUSE TRANSFORMATION			
	13-371-2	TRANSITIVE AND INTRANSITIVE--PASSIVE TRANSFORMATION			
	13-372-2	MORPHOLOGY--DERIVED SUFFIXES AND PREFIXES			
	21-252	PLAN ACHIEVEMENT TEST			
	10-373-3	ADVERTISING			
SET	17-049 IMAGE				
		TAKE ANY 3 OF THE FOLLOWING 5 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET; ASK YOUR TEACHER TO START SET NUMBER 17-049.			
	10-378-2	MOOD			
	10-390-2	PARAGRAPHS			
	10-393-2	COMMUNICATION HANGUPS			
	10-397-2	MAKING IT STRANGE			
	10-377-2	STRONG IMAGES			

test card has not been made, i.e., that the new selection is in fact a deliberate selection. Upon confirmation, the computer adds the new selection to the student's Program of Studies file automatically and from that point forward it is carried in his record.

As one would expect, PLAN POS's will vary considerably in type and amount of content covered, and in the rate and sequence in which that content is covered.

Finally, with regard to some simple operating characteristics, student programs of study are not easily generated by hand. They are run on an IBM 360 Model 50 computer. The specification of decision rules for POS generation required 200 pages of algorithms and flow charts plus 200 more pages of data tables and test score cut points. This is in addition to the 70,000 module descriptor codes necessary to organize, classify and sequence the instructional materials available in PLAN.

Over 140,000 units of core storage are required to store curriculum information about the modules in the PLAN system. The remaining 8,000 units of storage are required for processing. The processing time for each secondary student's POS (one in each of four subject matter areas: mathematics, science, language arts, and social studies) is approximately 40 seconds. While this seems like a very brief time, and indeed is very economical considering the size of the task, 40 seconds of continuous computer processing on a machine such as the IBM 360-50 represents an extremely large number of decisions for each student.

The generation of elementary school POS's is considerably simpler because of the absence of vocational goals to be considered. Running time for them is approximately 10 seconds for each of the four subject matter POS's.

In conclusion it should be indicated that, regardless of the nature and degree of planning that has gone on, the teacher is the final authority in the classroom. The teacher uses the recommended POS as he or she sees fit. He or she may implement the program of study in its entirety; may make minor revisions; may make major revisions; or may even ignore it completely and develop an alternative program of studies for the student. Whatever his or her final course of action, however, the teacher at least will have had the best counsel we could offer.

Student Assessment and Progress Monitoring

Student assessment and progress monitoring in PLAN was carried out at several levels. The most comprehensive is the annual testing program carried out near the end of the school year, usually late in May or early in June.

During this time the student takes an annual test battery consisting of an 18-scale Developed Abilities Performance battery assessing such variables as vocabulary development, reading comprehension, abstract reasoning ability, and the like. He also takes a 30-scale General Information Test to determine his pattern of functional interest; a 12-scale PLAN Interest Inventory to ascertain areas of potential or expressed interest; a Student Attitude Inventory; and a battery of PLAN Achievement Tests. (Note Figures 12, 13, and 14).

During this time data are also collected from the teacher with regard to such student classroom behavior dimensions as: his ability to work independently without frequent teacher supervision; the content presentation modes from which he seems to learn most readily; the degree of practice or drill he typically seems to require in order to master the materials; and the like. This latter type of information is used in recommending particular instructional methods for use with specific children.

A second level of student monitoring is represented by the bi-monthly Student Progress Report. (See Figure 15). Every two months, or more frequently if the teacher requests it, a Student Progress Report is produced. It is a cumulative report of the student's work from the beginning of the school year. It shows: the modules the student has taken; the day he started and completed them; his test performance on the module; whether modules have been added or dropped; the relevance of the various modules to his long-range goals; the modules he has successfully challenged; the modules currently active, i.e., the modules he has started but not yet completed; and the modules yet to do for the remaining portion of the year.

This student progress report, then, constitutes not only the student's academic history, but also yields information regarding his habitual pattern of thoroughness in studying modules, his conservativeness in challenging modules, his characteristic work rate, and the like. The report is produced in multiple copies so that the student, his parents, and his teacher each receive a copy. This report constitutes, if you will, a module test version of a report card. It communicates a great deal more information than a report card, however;

Figure 12

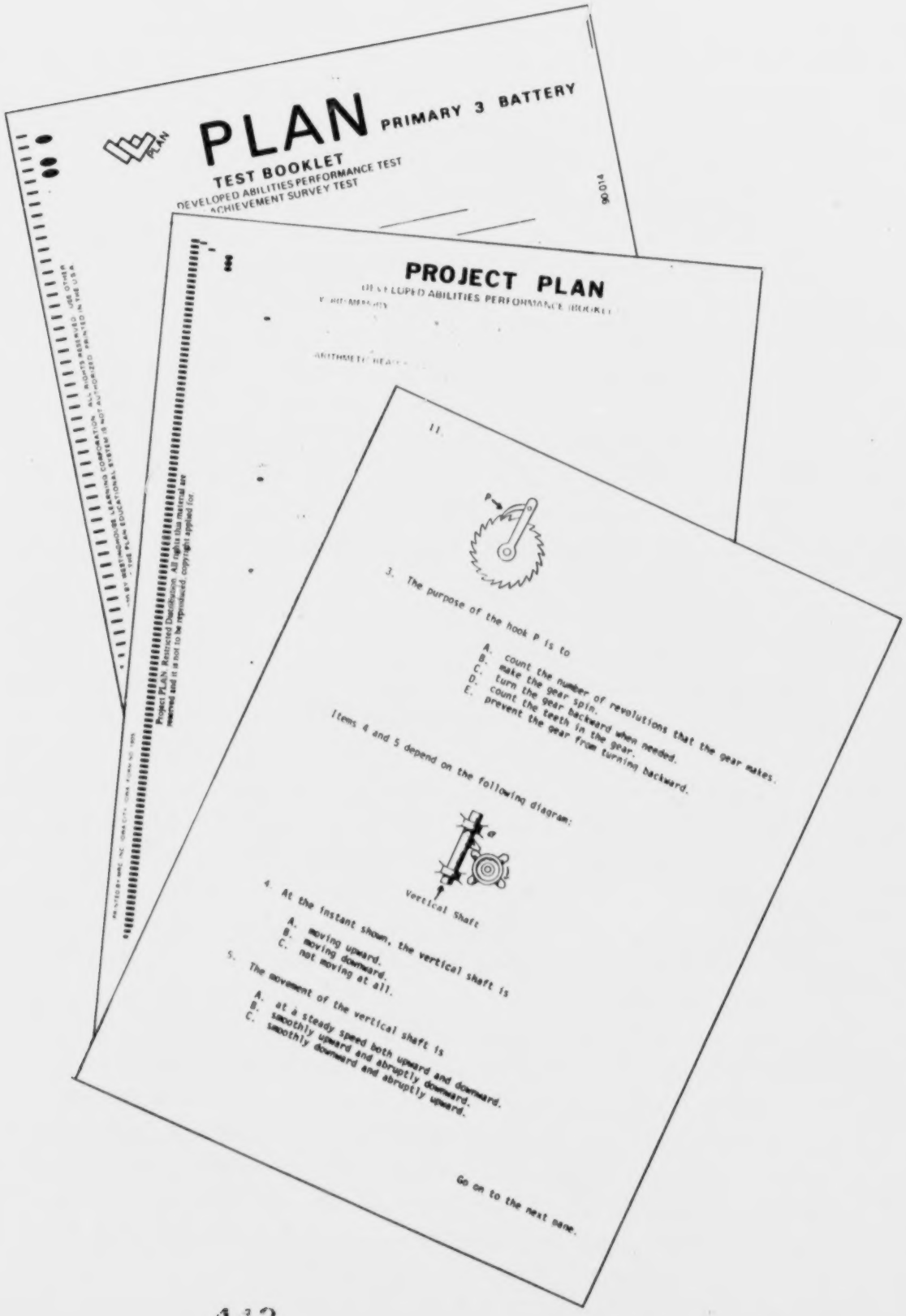
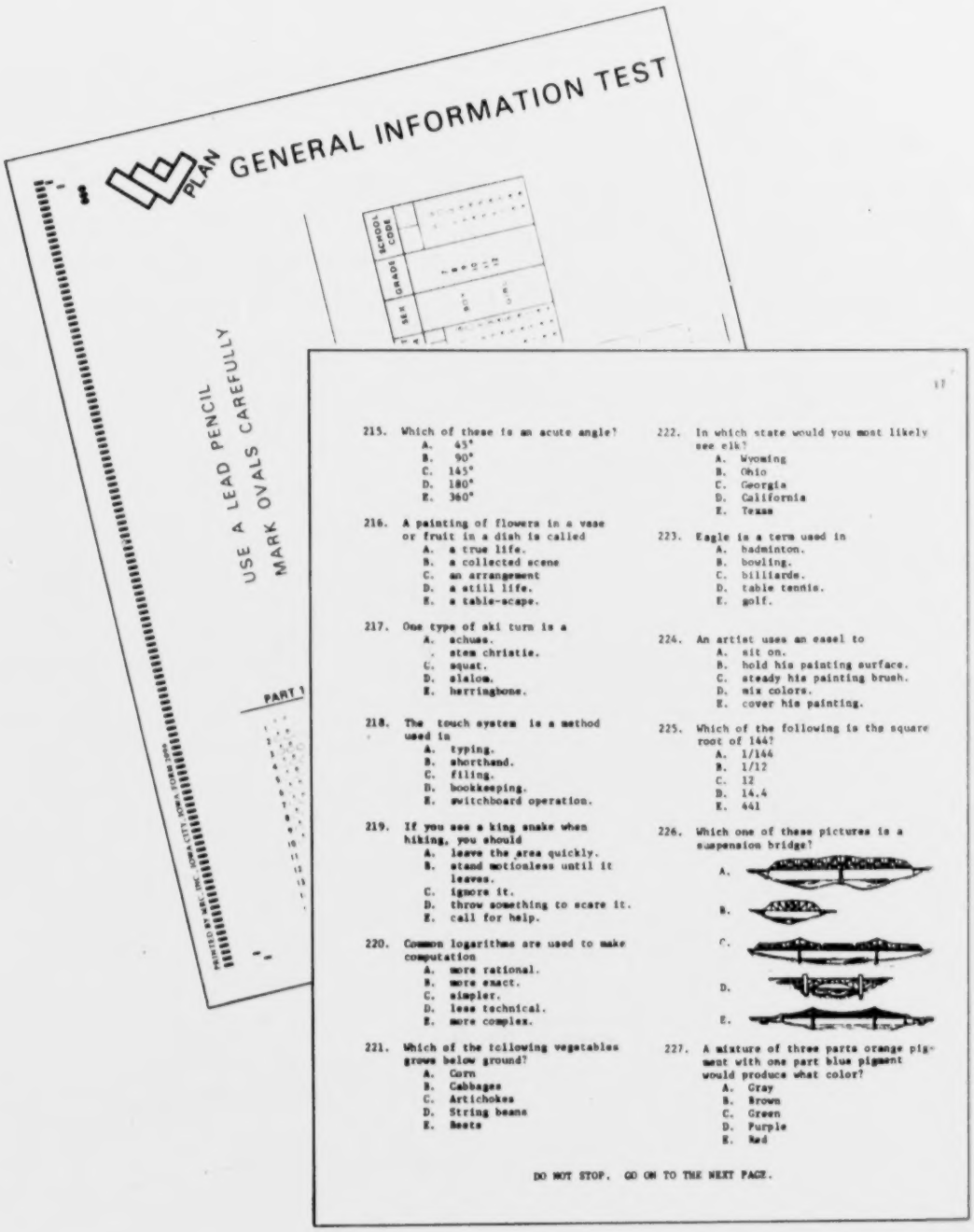
SAMPLE DAP MATERIALS

PLAN
PRIMARY 3 BATTERY
TEST BOOKLET
DEVELOPED ABILITIES PERFORMANCE TEST
ACHIEVEMENT SURVEY TEST
PROJECT PLAN
11
P
3. The purpose of the hook P is to
A. count the number of revolutions that the gear makes.
B. make the gear spin.
C. turn the gear backward when needed.
D. count the teeth in the gear.
E. prevent the gear from turning backward.
Items 4 and 5 depend on the following diagram:
Vertical Shaft
4. At the instant shown, the vertical shaft is
A. moving upward.
B. moving downward.
C. not moving at all.
5. The movement of the vertical shaft is
A. at a steady speed both upward and downward.
B. smoothly upward and abruptly downward.
C. smoothly downward and abruptly upward.
Go on to the next page.

Figure 13

SAMPLE GIT MATERIALS



PLAN GENERAL INFORMATION TEST

USE A LEAD PENCIL
MARK OVALS CAREFULLY

PART 1

17

215. Which of these is an acute angle?
A. 45°
B. 90°
C. 145°
D. 180°
E. 360°

216. A painting of flowers in a vase or fruit in a dish is called
A. a true life.
B. a collected scene
C. an arrangement
D. a still life.
E. a table-scape.

217. One type of ski turn is a
A. schuss.
B. stem christie.
C. squat.
D. slalom.
E. herringbone.

218. The touch system is a method used in
A. typing.
B. shorthand.
C. filing.
D. bookkeeping.
E. switchboard operation.

219. If you see a king snake when hiking, you should
A. leave the area quickly.
B. stand motionless until it leaves.
C. ignore it.
D. throw something to scare it.
E. call for help.

220. Common logarithms are used to make computation
A. more rational.
B. more exact.
C. simpler.
D. less technical.
E. more complex.

221. Which of the following vegetables grows below ground?
A. Corn
B. Cabbages
C. Artichokes
D. String beans
E. Beets

222. In which state would you most likely see elk?
A. Wyoming
B. Ohio
C. Georgia
D. California
E. Texas

223. Eagle is a term used in
A. badminton.
B. bowling.
C. billiards.
D. table tennis.
E. golf.

224. An artist uses an easel to
A. sit on.
B. hold his painting surface.
C. steady his painting brush.
D. mix colors.
E. cover his painting.

225. Which of the following is the square root of 144?
A. 1/144
B. 1/12
C. 12
D. 14.4
E. 441

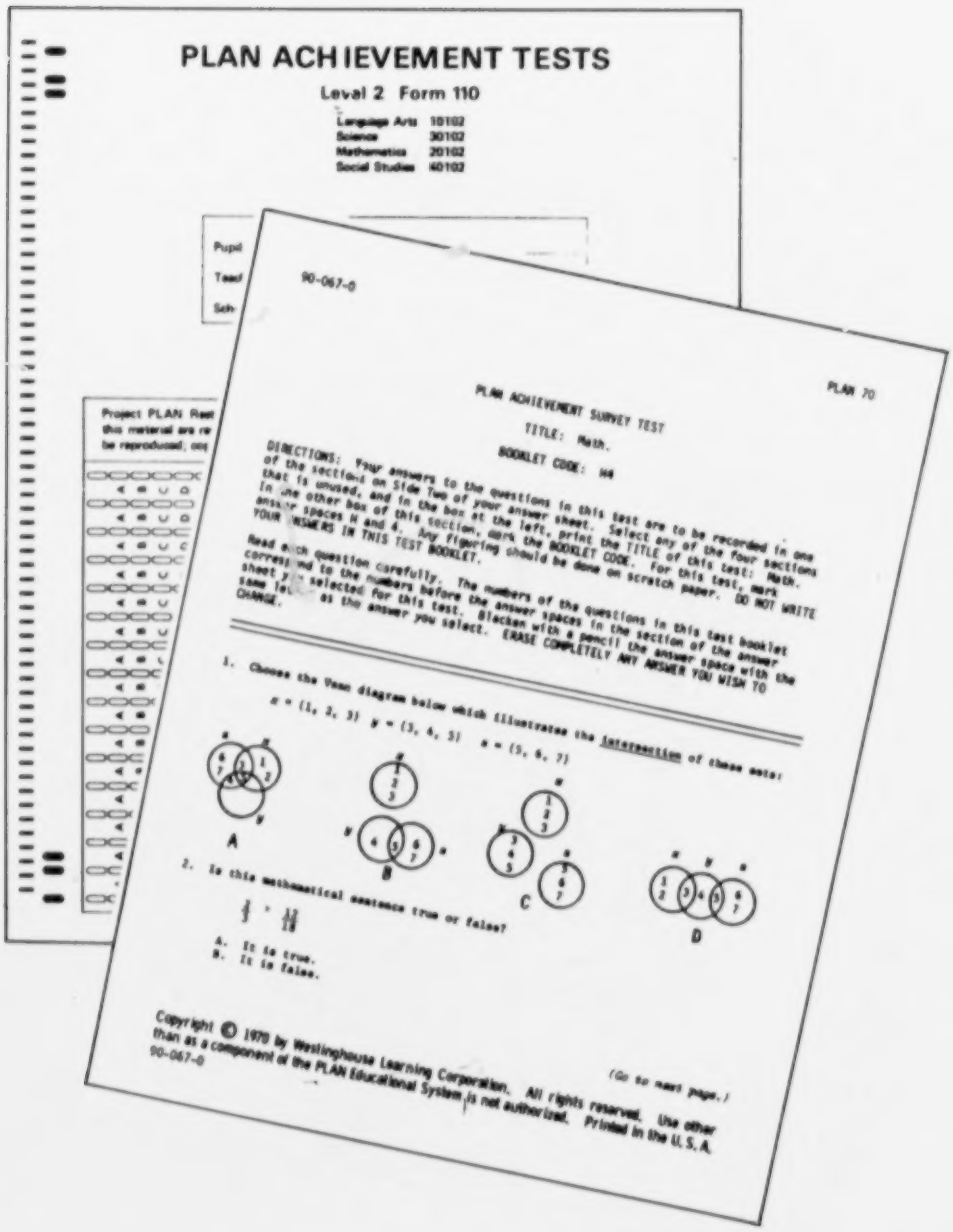
226. Which one of these pictures is a suspension bridge?
A.
B.
C.
D.
E.

227. A mixture of three parts orange pigment with one part blue pigment would produce what color?
A. Gray
B. Brown
C. Green
D. Purple
E. Red

DO NOT STOP. GO ON TO THE NEXT PAGE.

Figure 14

SAMPLE PAT MATERIALS



PLAN ACHIEVEMENT TESTS

Level 2 Form 110

Language Arts 10102
Science 30102
Mathematics 20102
Social Studies 40102

90-067-0

PLAN 70

PLAN ACHIEVEMENT SURVEY TEST

TITLE: Math.

BOOKLET CODE: H4

DIRECTIONS: Your answers to the questions in this test are to be recorded in one of the sections on Side Two of your answer sheet. Select any of the four sections that is unused, and in the box at the left, print the TITLE of this test: Math. In the other box of this section, mark the BOOKLET CODE. For this test: H4. answer spaces 4 and 4. Any figuring should be done on scratch paper. DO NOT WRITE YOUR ANSWERS IN THIS TEST BOOKLET.

Read each question carefully. The numbers of the questions in this test booklet correspond to the numbers before the answer spaces in the section of the answer sheet you selected for this test. Blacken with a pencil the answer space with the same letter as the answer you select. ERASE COMPLETELY ANY ANSWER YOU WISH TO CHANGE.

1. Choose the Venn diagram below which illustrates the intersection of these sets:

$x = \{1, 2, 3\}$ $y = \{3, 4, 5\}$ $z = \{5, 6, 7\}$

A B C D

2. Is this mathematical sentence true or false?

$\frac{1}{2} \cdot \frac{11}{18}$

A. It is true.
B. It is false.

(Go to next page.)

Copyright © 1970 by Westinghouse Learning Corporation. All rights reserved. Use other than as a component of the PLAN Educational System is not authorized. Printed in the U. S. A.

90-067-0

Figure 15

PERIODIC STUDENT PROGRESS REPORT

PLAN

PROGRAM OF STUDIES AND STUDENT PROGRESS REPORT FOR MCDOWELL JOHN

0006 SCHOOL TIERRA LINDA SCHOOL TEACHER MR. ROBERT STRIDE SUBJECT AREA SCIENCE DATE 04/04

COMPLETION CODE	MODULE NUMBER	MODULE NAME	START	DATE FINISHED
T-CERTIFIED	30-310-1	MICROORGANISMS	(2) SEP 22	OCT 27
T-CERTIFIED	30-301-2	INDIVIDUAL DIFFERENCES AND THEIR MEASUREMENT	(2) OCT 27	NOV 3
STD REVIEW	30-379-1	ELEMENTS AND CHANGE IN THE ECOSYSTEM	(1) NOV 5	NOV 5
STD REVIEW	30-385-2	BODY SYSTEMS	(1) NOV 17	DEC 19
STD REVIEW	30-312-1	INTRODUCTION TO SYSTEMS OF THE BODY- SKELETAL SYSTEM AND NERVOU	(1) NOV 3	NOV 3
STD REVIEW	30-311-2	INTRODUCTION TO DISEASE	(1) JAN 5	JAN 5
STD REVIEW	30-371-2	CONCEPT OF INTERACTION AND CHANGE	(1) JAN 13	JAN 13
MASTERED	30-384-1	CONSERVATION	(1) FEB 4	FEB 4
STD REVIEW	30-392-1	UNNATURAL CHANGES IN MAN	(1) JAN 19	JAN 19
STD REVIEW	30-378-1	DIVERSITY OF LIFE	(1) MAR 18	MAR 18
T-CERTIFIED	30-375-1	LIFE BEGETS LIFE II	(1) APR 1	APR 1
STD REVIEW	30-382-1	STRUCTURE ANALYSIS IN PLANTS	(1) APR 3	APR 3
UNTESTED	30-387-1	HELPFUL AND HARMFUL ORGANISMS	(0) MAR 4	
	GOICZ			
	30-380-2	LIFE TO LIFE	(0)	
	30-383-3	DIVERSITY IN PLANTS	(0)	
	30-374-3	LIFE BEGETS LIFE I	(0)	
	30-381-3	OUR SENSES	(0)	
	30-391-4	THE MICROSCOPE	(0)	

and it serves as a periodic heuristic for teacher-student interaction, counseling, and program planning.

Finally, the third and most frequent level of progress monitoring is the teacher's daily processing report. (See Figure 16). This daily report, available for the teacher each morning before the start of school, notifies the teacher of, among other things, student progress on modules on which the student is currently active, that is, modules which he has started and not yet completed. The final section of that report also gives test results of all modules for which tests were taken in the previous day.

Military, College, and Post-High School Counseling

The final aspect of the basic Guidance Program is the counseling junior and senior students receive to prepare them for the transition from high school. A series of six modules is involved. Two modules acquaint the student with the nature of his military obligations, the advantages and disadvantages of enlistment as compared to the draft, etc. Two others acquaint him with colleges and universities, their organizational structure, and how to apply to them. Those students who think they might go to college decide to apply for college admission and actually do so. Those who do not plan to go on to college immediately take a set of two modules dealing with junior and community college opportunities, on-the-job training, and job search and application skills. Sample objectives of this program are included in Figure 17. Regardless of a student's choice, i.e., college, military, or other post-high school commitment, each of these modules results in the student making some active movement toward transition from high school.

Figure 16

RECORD OF CLASSROOM ACTIVITY: DAILY PRINTOUT

```
HICKSVILLE JUNIOR     MR. LARRY DAUCH      CLASS 8    SOC STDY   09/11/69

E X C E P T I O N   S E C T I O N - - - - - - - - - - - - - - - - - - - - -

     THE PROCESSING EXCEPTIONS THAT FOLLOW MAY REQUIRE ACTION ON YOUR PART.

THE FOLLOWING STUDENTS WILL NEED TO RE-TEST ON THE MODULES SHOWN UNLESS
YOU TEACHER-CERTIFY THEIR COMPLETION OF THE MODULE OBJECTIVES.

     0902  CONOVER REEVE          89-702
     0863  GOLDWASSER ROBERT      89-701
     0896  STUHLMULLER JOHN       89-702


A C K N O W L E D G M E N T S   S E C T I O N - - - - - - - - - - - - - -

THE FOLLOWING STUDENTS HAVE BEEN REGISTERED FOR THIS CLASS IN SOC STUDIES

     0841  ARGENTO DARLENE        BEGIN TO WORK ON 89-701-2
     0842  ATTOLINO DONNA         BEGIN TO WORK ON 89-701-2
     0844  BATCHLER CARL          BEGIN TO WORK ON 89-701-2
     0846  BENTO GEORGE           BEGIN TO WORK ON 89-701-2
     0850  BRUNO JOSEPH.          BEGIN TO WORK ON 89-701-2
     0854  CARLINO JOSEPH         BEGIN TO WORK ON 89-701-2
     0856  CHAMPOVILLON WILLI     BEGIN TO WORK ON 89-701-2
     0802  CONOVER REEVE          BEGIN TO WORK ON 89-701-2

YOUR REQUEST FOR SUPPLIES WAS RECEIVED.

P L A N N I N G   S E C T I O N - - - - - - - - - - - - - - - - - - - - -

NO STATUS CARDS RECEIVED


T E S T   R E S U L T S   S E C T I O N - - - - - - - - - - - - - - - - -

CARLINO JOSEPH        89-701-2 CAREFULLY REVIEW 9512 03/04  9514 03/04
          OBJECTIVES ALL CORRECT WERE   9511  9513  9515  9516
          THEN BEGIN TO WORK ON 89-702-2
CONOVER REEVE         89-701-2 CAREFULLY REVIEW 9511 04/05  9512 03/04
          9514 03/04  9517 02/03
          OBJECTIVES ALL CORRECT WERE   9513  9515  9516
          THEN BEGIN TO WORK ON 89-702-2
CONOVER REEVE         89-702-2  RETEST OR HAVE YOUR TEACHER CERTIFY AFTER YOU
          RESTUDY     9521 00/01
          OBJECTIVES ALL CORRECT WERE   9518  9519  9520
          CONTINUE WORK ON THIS MODULE.

P O S   A N D   P R O G R E S S   R E P O R T S   S E C T I O N - - - - -

NO PROGRAM OF STUDIES OR PROGRESS REPORTS REQUESTED
```

Figure 17

SAMPLE OBJECTIVES - MILITARY, COLLEGE, AND POST-HIGH SCHOOL COUNSELING PROGRAM

You will be able to:

Describe the kinds of information you would expect to find from college handbooks, college catalogues, and a visit to a college campus.

List four main sources of funds which students use to meet the cost of a college education.

Write a one- to two-page report on three colleges, including information on the cost, entrance requirements, academic program, and college life, and on the advantages and disadvantages of each college for you.

Define the terms *draft*, *selective service*, and *conscription*.

Describe the responsibilities that every 18-year-old male has in connection with registering for the draft.

Identify examples of the five groups (Classes I-V) that local selective service boards use for classifying draft registrants, and the main steps a registrant can take if he chooses to appeal his classification.

Compare the major alternatives open to men regarding their military obligation: draft, enlistment, reserves, commission, and conscientious objection.

Complete a sample application form for (a) a job, (b) a college, or (c) a training program.

Prepare a résumé of your qualifications for a job, including the following kinds of information:

1. personal data,
2. educational background,
3. type of work desired or objective,
4. special skills or abilities,
5. work experiences, and
6. references.

Role-play a person who is being interviewed for (a) a job, (b) admission to college, or (c) a training program.

In preparation for leaving high school, apply for (a) a job, (b) admission to college, (c) a technical school or vocational training program, (d) an armed services program, or (e) other post-high school commitment.

A COMPREHENSIVE CAREER GUIDANCE SYSTEM IN ACTION

*Gail Clark**
*Cornelius Hospers**
*Carlton Stevens**
*Nina Tinkham**
*Samuel Wiens**
*Laurie Ganschow***
*Jack Hamilton***
*Brian Jones***

It is predicted that during the 1970's, as public and private schools move more and more in the direction of individualized education, greater emphasis will have to be placed upon individualizing youth development and career (i.e., life) planning assistance. This chapter describes a project which is attempting to develop, implement, evaluate, and revise youth-oriented programs within a Comprehensive Career Guidance System (CCGS) for individualized education settings where computer support facilities are available. The CCGS employs a systematic approach to develop and to evaluate guidance-oriented objectives and related instructional and counseling experiences for youth. To implement this process, staff from the American Institutes for Research, a non-profit research organization, serve as resource personnel for school staff and students in San Jose, California and Houston, Texas.

Instructional and counseling procedures include providing students with information about the requirements for (and the probable consequences of selecting) a wide variety of alternatives, with opportunities to assess their talents in relation to these alternatives, and with assistance in formulating their educational and life goals in light of this information. Since it is believed that the most efficient and personally satisfying learning and development result from goal-directed behavior, the main purpose of this guidance system is to help youth

---

**Teachers and counselors of the San Jose Unified School District.*

***Members of the Youth Development Research Program at the American Institutes for Research.*

Activities, procedures, and materials described in this paper are part of a project currently being conducted pursuant to Contract No. OEC-0-70-4929 with the Office of Education, U.S. Department of Health, Education, and Welfare, by the American Institutes for Research in cooperation with the San Jose Unified School District.

assess their multi-potentialities and limitations, to discover their needs, to formulate goals and related objectives, and to work toward realization of these goals and objectives with increasing ability to constructively manage their own behavior. The system is designed to assist students in preparing for life roles and activities that will be both meaningful and satisfying to them.

The Planning Process

The systematic approach being used in the development, implementation, and evaluation of objectives-based programs in the Comprehensive Career Guidance System involves five types of activities which are described in this section.

Identification of Youth Development Needs and Related Objectives

A comprehensive guidance system must define the various subpopulations comprising the total range of students, specify the desired terminal competencies of individual youths in these varied groups, identify the current status (entry level) of these competencies among youth, and formulate meaningful needs statements which: (a) describe the extent and nature of the discrepancies between these entry and terminal levels, and (b) can be translated into measurable objectives. For example, to facilitate the design of guidance and counseling programs for two schools in the San Jose Unified School District, a needs assessment procedure was recently implemented. This procedure involved approximately a 20 percent random sample of seventh, eighth, and ninth grade students at one of the schools.

Four trained adult interviewers went into each randomly selected classroom and interviewed small groups of seven or eight students. In these interviews, each student had opportunities to examine four separate decks of cards on which statements related to guidance and counseling needs were printed. In developing each statement, an attempt was made to make it as explicit as possible so that there would be little disagreement concerning the actual behavior involved, and so that a complete cafeteria of options would be available to stimulate each student to think of a wide range of alternatives which he could pursue in his career (i.e., life) development. The four decks emphasized the following areas: (1) Learning-to-Learn, (2) Educational-Vocational, (3) Interpersonal, and (4) Intrapersonal.

As the interviewee surveyed each deck of cards, he was asked to select the five needs statements which were most important to him in each category. Then he was asked to indicate not more than five needs with which he desired assistance if the appropriate resources were made available to him. If a particular deck did not cover all of his needs, he could write down the unstated ones on blank cards which were furnished. Finally, each individual ranked the four cover or top cards from the decks, thus indicating how important these four categories were to him in terms of his needs, and the order in which he would actually like assistance with the various need areas.

The process of making programs functional to the needs of students involves the development of instructional objectives and outcomes related to the identified needs. To develop the objectives and outcomes for the San Jose Unified Vocational Guidance Program, school staff members reviewed the needs assessment data (the collection of which was described above) in conjunction with other needs data provided by student follow-up surveys. The instructional objectives available in the Educational-Vocational Objectives Bank of the American Institutes for Research, and those of previously developed individualized programs, were also studied. Two such programs were: (1) the vocational long-range goal formulation program developed in Project PLAN, and (2) the You, Today and Tomorrow program developed by Martin Katz of Educational Testing Service.

As a result of this review process, the following eight general objectives were written for the program; specific youth-oriented outcomes were derived from them so that student learning and evaluation activities could be keyed to these guidelines:

OBJECTIVES:

1. Understand that this individualized Vocational Guidance program is designed to help you set up your own vocational and school goals and plans for achieving them, and to know the major goals of the program.

2. Identify important decisions, and the points in time when it is probably best to make them; and to recognize that if the decisions are made then, it will open the maximum number of opportunities for you.

3. Be familiar with some ways in which the availability and/or desirability of vocational opportunities are being influenced by trends resulting from social, economic, and technological factors.

4. Recognize the importance of grouping occupations according to things they have in common, and understand the Long Range Goal (LRG) system of grouping occupations.

5. Understand that information about your personal characteristics can help you set your vocational goals and that over time your personal characteristics may change making it important to consider these changes in your planning.

6. Collect and organize information about your abilities, interests, values, physical traits, and personal and social behavior which can affect your choices of school and vocational goals.

7. Explore 3 LRG's in depth and consider them as your own possible long range vocational goals.

8. Pick your first and second choice tentative long-range vocational goals, and plan a high-school program to help you reach these goals.

Classification of Objectives by Commonalities

Needs statements translated into meaningful behavioral objectives should constitute a rather extensive data bank of guidelines for guidance and counseling activities and should delineate the alternative types of assistance available for students. To expedite student comprehension of the available alternatives and to foster improved administrative efficiency in the development and evaluation of programs, the data bank of objectives should be organized in a meaningful fashion. A preliminary investigation of varied information sources as well as analyses of successful guidance programs and guidance-related research projects produced a grouping of student needs and objectives by content as shown below. The needs assessment procedure described earlier in this paper focuses on the first four of these content areas. The eight objectives comprising the San Jose program emphasize only the first content area.

Vocational. Behaviors related to exploring and making decisions concerning both opportunities in the world of work and personal characteristics related to such opportunities.

Educational. Behaviors required for exploring, considering, selecting, and pursuing the amount and kind of education one wants during school and throughout the rest of life.

Personal-Social. Intrapersonal competencies needed to function effectively as an independent person and interpersonal behaviors needed in small group situations, including two-person relationships. Behaviors applicable to various settings including home and classroom.

Learning-to-Learn.	Behaviors involved in handling varied learning tasks more effectively and efficiently. Learning how to learn in varied settings, not just in a formal classroom.
Social Responsibility Development.	Behaviors differentiated from those in the social behavior area because they are appropriate to secondary (e.g., government) rather than primary (e.g., family) social groups and systems.
Leisure.	Behaviors connected with the exploration and utilization of leisure, cultural, and recreational pursuits.

Another method for classifying youth needs and objectives is on the basis of general "activities" which a guidance system should provide for youth. The 12 components shown on the next page are believed to include all guidance and counseling functions related to youth needs. As indicated there, the 12 components are classified into two categories: direct interventions (learning activities employed directly with youth), and indirect interventions (implemented around youth on their behalf). To date, the major focus of the Comprehensive Career Guidance System has been on direct interventions.

Specification of Alternative Strategies

The third activity in the systematic approach to the development and evaluation of CCGS programs involves the exploration and selection of suitable learning experiences for youth and their parents. Clear statements of priority needs and related objectives permit creativity in the selection and investigation of a wide range of possible instructional and counseling procedures. Project staff have attempted to: (1) compile a body of techniques and procedures which can be used in implementing the 12 components outlined in the chart on the following page, (2) evaluate the effectiveness of some of the currently available techniques and procedures, and (3) conduct developmental work where suitable strategies have not been available. These developmental efforts have resulted in the design of a variety of instructional-counseling strategies which cover all seven of the direct intervention components, as well as four of the six content areas of student needs, i.e., educational, vocational, personal-social, and academic-learning. From this wide range of available strategies, staff members in the participating San Jose schools selected the ones they deemed most appropriate for the students involved in the field test programs

DIRECT INTERVENTIONS--*learning activities employed directly with the student.*

A. Developmental Phase--focusing on preventive guidance, positive mental health, and the facilitation of student career development through a core of continuous, sequential learning activities for all students.

1. Orientation-in--orienting students for a new educational level, a new educational system such as individualized education, an innovative guidance program, or a new specific school setting.

2. Personal assessment--helping students understand and develop their own abilities, interests, physical attributes, personal and social behaviors, and values and preferences related to available career opportunities in each of the six areas of behavior.

3. Personal choice opportunities--assisting students to consider career options available in each of the six areas of behavior.

4. Personal problem-solving skills--enabling students to make decisions and plans wisely and to implement these so as to use personal assessment and personal choice opportunities information in each of the six areas of behavior.

5. Formulating and pursuing personal goals--so that each student will be assisted to formulate and to pursue his goals and his plans for achieving these goals in each of the six areas of behavior.

B. Prescriptive Phase--focusing on guidance learning activities that are corrective and remedial in nature for those students experiencing specifiable problems for which assistance already is available in the guidance program or can be developed.

6. Within-school prescribed learning experiences--working with a student or group of students experiencing learning, intrapersonal and interpersonal problems or any idiosyncratic problem occurring in the six areas of behavior.

7. Orientation-out--providing prescribed learning experiences for student problems occurring at times such as when they are entering the world of work, dropping out without specific plans, enlisting in the military.

INDIRECT INTERVENTIONS--*implemented by technological or human resources around the student on his behalf in order to assist the student to protect and foster the development of his individuality.*

A. Interventions implemented through providing assistance to assess and possibly to modify:

8. Aspects of the educational setting and system

9. School personnel

10. Home and neighborhood factors

11. Community resources (e.g., health, social, and welfare agencies, businesses and industries)

B. Interventions implemented through:

12. Guidance-related research and evaluation--experimentally controlled studies of guidance and counselling materials and procedures, follow-up studies, and analyses of changes in the characteristics and needs of the student population.

in two of the six content areas (vocational and personal-social). These strategies incorporated materials such as films, film-strips, slides, books, magazine articles, audio-tapes, job experience kits, simulation games, abilities tests, interest inventories, and values inventories.

Implementation of Selected Strategies

The instructional and counseling strategies which are considered to be most effective in assisting youth to reach particular objectives are organized into individualized learning units. Each unit contains: (1) statements of the measurable objectives expressed in terms of desired youth outcomes, (2) suggestions of resources each youth might use and procedures he might follow to achieve each objective, and (3) references to an evaluation procedure or instrument which will help each youth determine whether or not he has met each objective. Units such as those in the San Jose Unified Vocational Guidance Program presented in the chart on the next page have the advantage that they can be used either in separate guidance classes, individual counseling sessions, group counseling or guidance experiences, or can be integrated into other instructional materials and procedures in conventional curriculum areas.

To organize units into programs for each CCGS direct intervention component, a central theme of "each student as a problem solver" has been employed. That is, each program attempts to help youth apply problem-solving skills to formulate and to pursue personal goals and plans in each of the six areas of behavior. The following diagram briefly illustrates the personal problem-solving skills around which all CCGS instructional-counseling (i.e., direct intervention) experiences have been organized.

SUMMARY OF PERSONAL PROBLEM-SOLVING SKILLS

Planning Emphasis:	Perceiving and defining problem
	Gathering and evaluating information
Decision Making Emphasis:	Considering multiple alternatives and their related consequences
	Selecting alternate solutions and plans
Implementing/Managing Emphasis:	Implementing plans
	Analyzing product/process

SAN JOSE VOCATIONAL GUIDANCE UNITS

1. Orientation

The purpose of this unit is to provide a general idea of what this course is about, to furnish some instructions to help each student understand the individualized student guides, and to help each student understand his responsibilities in the program.

2. Planning: Choice, Not Chance

This unit points out the key decisions that come up in a student's life, and suggests appropriate times to make them. If made at the right time, many doors remain open to an individual.

3. Trends

Over the years, a person's chances of getting a particular job will change. The desirability of various occupations will change over time, too. This unit shows how social, economic, and technological factors produce trends that influence change. The student learns how he can get information on job trends and why this information is important to him when he thinks about what occupations might be suitable long range goals for him.

4. Overview of Vocational Long Range Goals

Different occupations can be grouped together according to their similarities. This unit explains why grouping occupations is important. It also explains one particular system that groups occupations by similarities in the amount of education or training they require, the developed abilities of people who have entered them, and the typical activities of workers on the job.

5. Things Change

In this unit, the kinds of information about a person that should be considered when he thinks about how he wants to "make his life" are explained. It shows that certain things about a person can be changed, or will change by themselves. It also shows how these changes can affect a person's chances of reaching his goals.

6. Who Am I?

As the student works on this unit, he collects and organizes both self-report and measured information about his personal characteristics which can affect the school and work goals he eventually will choose.

7. In-Depth Study of Vocational Long Range Goals

Using information from his personal assessment summary, the student selects three occupational families to explore and to consider as possible goals.

8. Reflections

The student picks the Vocational Long Range Goal families that he thinks will best suit him and explains his decision-making. In addition, he designs an educational plan that will help him reach his vocational goals.

Evaluation of Selected Strategies

The fifth activity in the systematic design and improvement of CCGS components involves evaluation, feedback, and correction tasks leading to the validation of successful strategies, improvement of partially successful strategies, and development of more appropriate ones. This activity necessitates the development of tests and performance standards for measuring youth attainment of objectives (i.e., anticipated learning effects). To assist in the evaluation of direct intervention program outcomes, two major types of instruments have been used: (1) guidance proficiency tests (i.e., end-of-learning unit tests focusing on knowledge, attitudinal, and overt behavioral outcomes), and (2) guidance survey tests assessing achievement and attitudes across three or four learning units or across complete programs. Several field studies were conducted to evaluate the effects of programs from this guidance system; to determine whether program procedures were carried out as intended; and to make informal examinations of program side effects that were unanticipated. Direct intervention programs

which were investigated in this manner include: (1) Orientation and Personal Assessment; (2) Personal and Social Development; (3) Effective Personal Problem Solving; and (4) Educational and Vocational Goal Formulation.

Evaluation results have been fed back to the guidance system to make modifications both in products and in procedures developed and employed in previous activities. For instance, in the case of the Personal and Social Development Program, a teacher from one of the San Jose field test schools along with several of her students joined with project staff to revise instructional and counseling materials and procedures. This joint effort resulted in adding to the program new films, audio-tapes, small group discussions, role playing activities, and simulation games. Kathy Eckstrom, an 11th grade student, stated, "Working on the Personal and Social Development Program helped me understand what kind of person I am, and how I can help make myself a better person." Nancy Mason, another 11th grader, declared, "I have learned that most people judge you by the way you act, so therefore you should know how to act properly. I've learned that it is better for you and the other person if you 'keep your cool' in a difficult situation. Also, I have found out that life is a give and take situation where you can make life a little bit better for yourself if you give more than you take."

Outcomes of Applying the Planning Process

The ultimate aim of employing the planning process described above is a comprehensive data bank of behavioral objectives, each keyed to a variety of appropriate instructional, counseling, and evaluational materials and procedures available for student, parent, counselor, and teacher use. The ultimate desired outcome is an exhaustive catalog of empirically validated instructional and counseling strategies keyed to behavioral objectives and cross-indexed with: (1) type of youth need and problem (i.e., a need for which a youth desires assistance); (2) youth characteristics which have been demonstrated to be associated with the effectiveness of a strategy; (3) situational conditions under which an effective strategy is employed; and (4) characteristics of the individual(s) administering a strategy. With such a catalog, guidance personnel should be better able to individualize guidance services and, hopefully, help education in general adjust to the separate needs of each student. Because of the varied and ever-changing nature of youth characteristics and needs, the

variety of strategies investigated for possible incorporation into this catalog will have to be constantly expanded. In addition, continued advances must be made in the specification and improvement of decision rules for the selection of strategies from this catalog.

III.

CURRENT STATUS
OF OTHER CAREER DEVELOPMENT SYSTEMS

INTRODUCTION

In 1969, the U. S. Government Printing Office issued the report, Computer-Based Vocational Guidance Systems, which was edited by Alice Scates. That document contains basic descriptions of the following systems which represented the 1969 state of the art of computer involvement in guidance activities:

The Harvard-Needs-Newton Information System for Vocational Decisions
The IBM Experimental Educational and Career Exploration System
The American Institutes for Research Comprehensive Vocational Guidance System
The SDC Vocational Counseling System
The Rochester Career Guidance Project
The Pennsylvania State University Computer-Assisted Career Exploration System
The University of Oregon GUIDPAK System
The Willowbrook Computerized Vocational Information System
The Palo Alto Computer-Based Course Selection and Counseling System
The Bartlesville Total Guidance Information Support System

AIR's Comprehensive Vocational Guidance System in conjunction with Project PLAN has already been described more fully in the preceding section. So has its subsequent Comprehensive Career Guidance System. Allan Ellis and I represent the Harvard-Needs-Newton Information System for Vocational Decisions. The System itself rests on the shelf having proved its point, namely that an interactive inquiry system can be provided which has sufficient conversational characteristics to attract students and cast their minds into their inner selves while learning decision-making in career development. At the present time, Ellis and I must play a receiving rather than a contributory role at this Conference, except for sounding the need for progress along the dimensions of our System. We hope to use the new realization of the need for a union of career education and general student development to further the progress of our work.

The IBM Educational and Career Exploration System and the Willowbrook Computerized Vocational Information System continue to exist. Representatives of each System will report on its current status in this Section. Tommy Roberts, who got up the Bartlesville Total Guidance Information System, attends in the

same role as Ellis and I, namely, to learn what now exists and to see if anything we know how to construct and operate can be of current use.

Several systems have been started since the Scates volume on computers in guidance was published. Therefore these systems will be described in greater detail in these proceedings.

This section basically consists of reports on the status of previously described systems and introductory descriptions of several new ones. For convenience, the reports are organized according to their degree 1) of focus from learning towards guidance and 2) of computer involvement in the actual guidance activities. The resulting report grouping is as follows:

A. Guidance in a learning system
   1. The U. S. Air Force Advanced Instructional System - Colonel Walter F. Murphy
   2. FSU Program BDA - John R. Bonar
   3. OSU Operation Guidance - Robert E. Campbell and Warren N. Suzuki

B. Computer free guidance systems
   1. AEL Career Decision-Making Program - David W. Winefordner
   2. EDUTEK Self-Instructional Mediated Career Education Project - Richard L. Douglass

C. Computer involved guidance systems
   1. Willowbrook Computerized Vocational Information System - JoAnn Harris
   2. IBM Education and Career Exploration System - Al Mallory and Roger Myers
   3. ETS System for Interactive Guidance and Information - Warren Chapman
   4. UW/M Computerized Guidance Programs - Russell N. Cassel

Guidance in a Learning System

ADVANCED INSTRUCTIONAL SYSTEM

*Walter F. Murphy**

Generally, Air Force Technical Training must be thought of as vocational training. The Technical Training Division, Air Force Human Resources Laboratory (AFHRL), is located at Lowry AFB and services all Technical Training Centers of the Air Training Command. Our mission in Technical Training may be summarized as "Improvements in the Training System through improvements in media, methods and systems." Since our establishment in July of 1969 we have used two basic strategies in working with our User; first, we have accepted a number of short-range requests for help and, secondly, we have planned a long-range advanced development effort under Project "INNOVATE." The thrust of this paper is to briefly describe our effort entitled "Advanced Instructional System" under Project INNOVATE. This system is referenced throughout the remainder of this summary as AIS.

The AIS is to be a large scale computer-based multimedia training system which will be initially demonstrated in a technical (or vocational) training setting and then later expanded into the professional education areas such as the Air Force Academy and the Air University. The major goal of AIS is to demonstrate that a computer-based multimedia training system can provide significant cost-effective improvements in the operation of three training courses at Lowry AFB. This system will provide day-to-day training for about 2,000 students. Some of the features we will incorporate are: CAI and CMI programs, provision for instructors to develop instructional material, individualized instruction, self-pacing and automated testing. Sub-goals include: application of the latest training technology and instructional media, full development of the managerial processes offered by the computer, selection

---

**Walter F. Murphy is Chief of the Air Force Technical Training Division at the Air Force Human Resources Laboratory, Lowry Air Force Base.*

of the most cost-effective multimedia approaches for both improved learning outcomes as well as potential cost-savings, and a modular approach to provide the flexibility for promoting expansion beyond the current three courses we are now investigating.

Our current efforts, consisting of six research contracts, have been organized to provide us with a firm foundation on which to develop the AIS as a total training system. With the exception of the System Specification Contract, the efforts are such that they will provide payoff for the Training Command independent of AIS itself.

The first contract is for the functional description of the AIS. The desired output will be a detailed specification of performance requirements and cost schedule estimates for the development of AIS. This information will provide the design and program baseline data for total system procurement.

The next three of our contracts concern the Inventory Management Course, the Precision Measuring Equipment Course, and the Weapons Mechanics Course. The effort here may be described as the systems approach to training wherein one uses job analysis to help determine what the student is to be trained for, then determines how the tasks may be broken into training objectives, then how one will train to meet these objectives, then develops the training package (media, materials, etc.), and finally, validates the training program by field tests. The adaptation of these materials for the computer-based system is all that remains for implementing these courses for the AIS.

The fifth contract is for the design and development of a study carrel for use within the Technical Training setting. We will determine what types of student support will be required for the study carrel.

The last of our current contract efforts is for the development of an Adaptive Instructional Model: that is, an aptitude by treatment interaction model which will be used to support individualization of lesson prescription and thus self-pacing. A manual mode of operation is also required. This contract was awarded by the end of October 1971.

Many of our exploratory development efforts are related to the AIS in some manner. With this coordination of exploratory and advanced development efforts planned to answer questions about the design and development of the Advanced Instructional System we expect to go for the big system early in 1972.

In summary, the Advanced Instructional System will be a prototype system for the administration and management of individualized technical training on a large scale. We feel it has great potential for extension to the administration and management of civilian vocational training programs.

FSU PROGRAM BDA

*John R. Bonar**

Program BDA is a computer-managed instructional program developed to train academic advisors for students in the Basic Division of the Florida State University. Most of the material, however, would be just as relevant to the preparation of academic advisors at any undergraduate level.

Progress through this course is on an individualized basis and in most instances the course can be completed in approximately three days of rather full participation. Instead of attending a series of orientations or formal lecture sessions, the academic advisor works independently through the materials presented in the course and a computer-managed instruction system is used to help him evaluate his progress.

The course consists of a number of cognitive and synthesis units. The cognitive units present the factual information with which the academic advisor must be familiar in order to make sound recommendations concerning academic advisement. The synthesis units, as the term implies, allow him to pull together and apply the information gleaned from the cognitive units. The technique for accomplishing this centers around the development of a number of "case studies" in which stereotypic students, as advisees, are built up by use of fictitious data. The synthesis units are the heart of the course as they afford the academic advisor an opportunity to practice what he has learned. Not incidentally, the major terminal performance objectives for this course (Exhibit 1) coincide with the specific objectives for the synthesis units (Exhibit 2).

In Program BDA there are the seven cognitive units and the four synthesis units outlined in Exhibit 2. The content for each of the units has been bound in booklet form and these booklets are available from the author of Program BDA. For each unit the computer presents a series of criterion-referenced evaluative items on the unit. If the academic advisor misses more than 20% of

---

**John R. Bonar is an Instructor in Educational Administration, College of Education at the Florida State University.*

the items he reviews the appropriate content materials and returns to take a parallel test on the computer. An academic advisor is allowed to take a maximum of two tests on any one unit. If he does not pass 80% of the evaluative items on the second test for a unit, the academic advisor is required to consult with the author of the program before proceeding. If he answers at least 80% of the evaluative items correctly, on either the first or the second test, he is instructed to proceed to the next unit. The flow of these decisions is charted in Exhibit 3.

Program BDA was designed according to a Systems Approach Model for the development of instructional materials.

Exhibit 1

MAJOR TERMINAL PERFORMANCE OBJECTIVES

OBJECTIVE 1:

When given fictitious student input data, the FSU General Catalog, Programs in Teacher Education at FSU, and Lewis' Self-Advisement Handbook, the advisor will be able to prepare a suitable trial schedule of classes for the initial quarter for entering freshmen students. The "suitability" of the trial schedule will be determined by matching it with an "expert" developed schedule.

OBJECTIVE 2:

When given fictitious student input data, the FSU General Catalog, Programs in Teacher Education at FSU, and Lewis' Self-Advisement Handbook, the advisor will be able to prepare a sound Basic Division program (two-year Liberal Studies plus Pre-Professional program) for freshman students. The "soundness" of a program will be determined by comparing it with an "expert" developed program.

OBJECTIVE 3:

When given fictitious student input data, the FSU General Catalog, Programs in Teacher Education at FSU, and Lewis' Self-Advisement Handbook, the advisor will be able to prepare a suitable trial schedule of classes for the initial quarter for entering transfer students to the Basic Division. The "suitability" of a trial schedule will be determined by matching it with an "expert" developed schedule.

OBJECTIVE 4:

When given fictitious student input data, the FSU General Catalog, Programs in Teacher Education at FSU, and Lewis' Self-Advisement Handbook, the advisor will be able to prepare a sound remaining Basic Division program (Liberal Studies plus Pre-Professional program) for transfer students to the Basic Division. The "soundness" of a program will be determined by comparing it with an "expert" developed program.

Exhibit 2

COGNITIVE AND SYNTHESIS UNITS - TOPIC OUTLINE

UNIT Z
COLLEGE OF EDUCATION ADVISING PROGRAM GENERAL INFORMATION:
(For College of Education advisor use only.)

1) CoE advising program - organization and rationale.
2) CoE advising program - calendar of advisor quarterly duties.
3) CoE advising program - assorted business matters.
4) CoE advising program - form samples and descriptions of use.

UNIT A
GENERAL UNIVERSITY INFORMATION:

1) Advisement and recordkeeping at FSU - an overview.
2) Divisional admission guidelines.
3) A review of pertinent advising forms - Trial Schedules, Drop-Add Forms, Class Schedules, etc.
4) Trial scheduling, major change, and Drop-Add yearly calendar.
5) Arts and Sciences vs. College of Education programs (majors-minors, language options, etc.)
6) Classification of students, distribution of coursework, and "load" restrictions.
7) Grading
   a) Explanation of course offerings.
   b) Grading practices.
   c) Placement-proficiency tests.
   d) Credit hours and quality points.
   e) Transfer credit and correspondence work.
   f) S-U grading basis.
   g) Auditing courses.
   h) Retention.
8) Example calculations - grade point averages and retention.
9) Center for Participant Education (CPE) coursework.
10) Physical Education and ROTC.

UNIT B
LIBERAL STUDIES GENERAL INFORMATION:

1) The Liberal Studies Program - objectives.
2) The Liberal Studies area requirements - overview.
3) Liberal Studies typical coursework selections.
4) Miscellaneous Liberal Studies scheduling comments.
5) Eligibility criteria for transfer from the Basic Division.
6) Special programs - the Honors program and overseas study.

UNIT C
COURSEWORK EXEMPTIONS AND PLACEMENT:

1) Freshmen English placement criteria.
2) Freshmen Mathematics placement criteria.
3) Foreign language placement criteria.
4) Use of placement criteria and Florida 12th Grade Test scores to determine placement.

UNIT D
PRE-PROFESSIONAL COURSEWORK IN THE MAJOR AND ELECTIVE COURSEWORK:

1) Lower-division coursework in the major - overview.
2) Selected majors - partial lower-division major coursework requirements and sources of program information.
3) Lower-division elective coursework.

SYNTHESIS UNIT 1

Use of knowledge gained from Units A, B, C, and D plus fictitious student data input to produce trial class schedules for entering Freshmen.

UNIT E
PATTERNS AND SEQUENCING IN LIBERAL STUDIES AND PRE-PROFESSIONAL AREAS:

1) Recommended Liberal Studies coursework patterns - the contracted and the expanded views.
2) Liberal Studies coursework sequencing - required and optional sequencing.
3) Recommended Pre-Professional coursework patterns and sequencing.

SYNTHESIS UNIT 2

Use of knowledge gained from Units A, B, C, D, and E plus fictitious student data input to produce Basic Division programs for Freshmen.

UNIT F
TRANSFER COURSEWORK EQUIVALENCIES AND PLACEMENT GUIDELINES:

1) Coursework equivalencies for transfer students - general considerations.
2) Placement guidelines in cases of partial completion of required Liberal Studies sequences and required Pre-Professional prerequisites.

SYNTHESIS UNIT 3

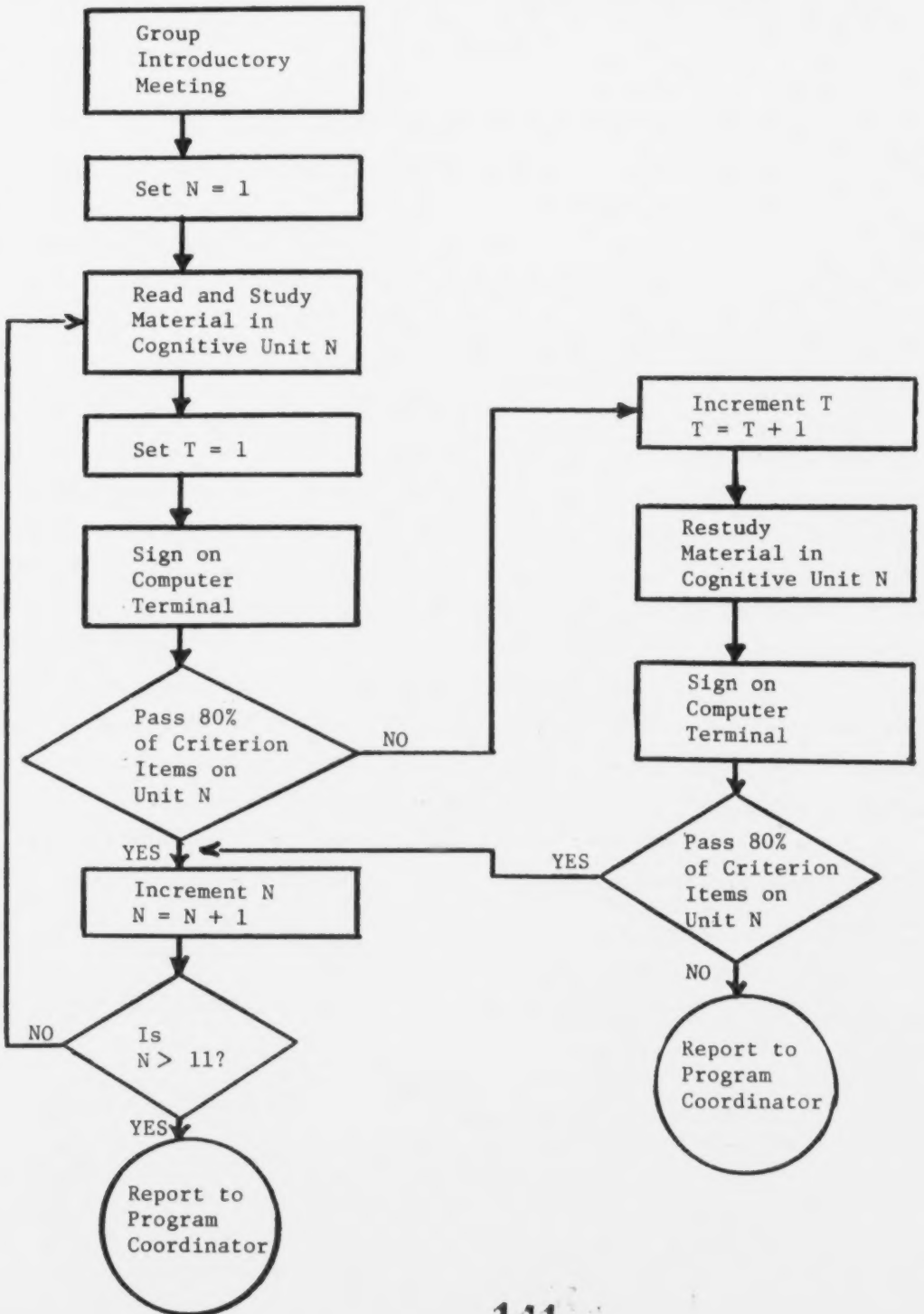
Use of knowledge gained from Units A, B, C, D, E, and F plus fictitious student data input to produce transfer student trial class schedules.

SYNTHESIS UNIT 4

Use of knowledge gained from Units A, B, C, D, E, and F plus fictitious student student data input to produce remaining Basic Division programs for transfer students.

Exhibit 3

FLOWCHART OF THE COMPUTER STRATEGY FOR A CMI PROGRAM TO TRAIN ADVISORS FOR STUDENTS IN THE BASIC DIVISION OF THE FLORIDA STATE UNIVERSITY


Group Introductory Meeting
Set N = 1
Read and Study Material in Cognitive Unit N
Set T = 1
Sign on Computer Terminal
Pass 80% of Criterion Items on Unit N
NO
YES
Increment T T = T + 1
Restudy Material in Cognitive Unit N
Sign on Computer Terminal
Pass 80% of Criterion Items on Unit N
YES
NO
Increment N N = N + 1
Is N > 11?
NO
YES
Report to Program Coordinator
Report to Program Coordinator

OSU OPERATION GUIDANCE - THE SYSTEMS APPROACH: AN EMERGING BEHAVIORAL MODEL FOR CAREER GUIDANCE

*Robert E. Campbell**
*Warren N. Suzuki**

Operation Guidance consists of three sequential projects as follow:

Operation Guidance I (completed) - The development of a procedural model (1969-1971)

Operation Guidance II (in process) - The development of procedural and instructional materials (1971-1972)

Operation Guidance III (projected) - Field test of the model, procedures, and materials (1972-1974)

Operation Guidance I was initiated in 1969 and culminated in 1971 with the development of an innovative procedural model for improving career guidance programs in senior high school. The model, based on a systems approach, (a) emphasizes student behavioral objectives, (b) gives alternative methods for accomplishing these objectives, (c) provides program evaluation strategies, (d) incorporates guidelines for program change adjustments, (e) encourages optimal use of all local resources, and (f) can be operationally demonstrated in pilot locations and subsequently replicated in other locations. The model consists of 10 procedural phases, each phase reflecting an aspect of the systems approach (such as defining student behavioral objectives, generating career guidance methods, and implementing and evaluating the program).

The model was developed over a two-year period in cooperation with a comprehensive senior high school. The 10 phases are outlined below:

Phase I - Context Evaluation

Phase II - Assigning Program Goal Priorities

Phase III - The Translation of Goals to Student Behavioral Objectives

---

**Robert E. Campbell and Warren N. Suzuki are at The Center for Vocational and Technical Education, The Ohio State University.*

Phase IV - Input Evaluation: Method Selection

Phase V - Input Evaluation: Selection of Techniques

Phase VI - Diffusion: Trial Implementation

Phase VII - Process Evaluation

Phase VIII - Product Evaluation

Phase IX - Adoption

Phase X - Recycling

Operation Guidance II began in 1971 and is designed to provide two major outcomes: (1) a product package, and (2) an installation package. The product package will include procedures, checklists, evaluative instruments, and lists of career guidance methods and techniques that are needed by personnel in a high school to upgrade their career guidance program by using the Center-developed methodology. The installation package consists of instructional materials, criterion tests, and procedures to enable personnel in a high school to acquire the knowledges and skills required to use the product package effectively. These two major outcomes are being developed in cooperation with Atlanta, Georgia and Charleston, West Virginia.

Operation Guidance III is projected to start in late 1972. As a continuation of Operation Guidance II, it is intended to provide a field test of the product and installation packages developed in II. The use of the packages by personnel at the test sites will approximate as closely as possible the application of the materials and procedures in the "real world." Tentatively, four high schools will be selected as test sites.

Computer Free Guidance Systems

AEL CAREER DECISION-MAKING PROGRAM

*David W. Winefordner**

Most young people, particularly those in isolated areas such as Appalachia, have limited exposure to the world of work. The guidance services which are designed to help them make knowledgeable educational and vocational decisions are, all too often, inadequate. Thus when the time comes to choose an occupation, the decision is determined primarily by whatever work happens to be available at the time they enter the job market.

At the Appalachia Educational Laboratory, the Career Decision-Making Program team is developing a design for a K-12 program which will help young people gain greater understanding of themselves and the world of work, and improve their decision-making skills so that they are better able to make realistic plans for the future. To achieve this, AEL is concentrating upon developing a program focusing upon career orientation, exploration and decision-making.

The AEL program will be compatible with the Career Education Model of the U. S. Office of Education.

The basic framework for the Career Decision-Making Program is the Data-People-Things structure and the Worker Trait Group arrangement of the Dictionary of Occupational Titles (D.O.T.), published by the U. S. Department of Labor.

The AEL program is divided into three components: (1) Career Awareness; (2) Career Orientation; and (3) Career Exploration and Decision-Making.

Career Awareness

The Career Awareness component, designed for the elementary grades (1-6), will introduce basic vocational concepts and provide students with greater

---

**David W. Winefordner is Director of the Career Decision-Making Program at the Appalachia Educational Laboratory, Charleston, West Virginia.*

appreciation and understanding of all types of work. The Data-People-Things Units will acquaint children with the D-P-T structure. These units also will lead to an understanding of the Worker Trait Group Orientation Units for the middle school years.

The Concepts of Work Units will present additional concepts appropriate for introducing elementary school students to the world of work.

Career Orientation

Career Orientation is the focus of the learning experiences planned for the middle school grades (5-8). At this stage students will study units on the Worker Trait Group Orientation (the 114 categories identified in the D.O.T.) and Occupational Clusters (broad vocational areas which exhibit similar characteristics). Materials and procedures used at this level will provide the student with the background information necessary for career exploration in the secondary school years.

Career Exploration and Decision-Making

It is on the Career Exploration and Decision-Making component for the secondary level (grades 7-12) that AEL is placing the initial developmental emphasis.

A series of 15 sequenced units is being prepared so that, as a student works his way through these units, he gains a comprehensive overview of the world of work, greater understanding of himself (his aptitudes and interests, etc.), and experience in making decisions which determine his future. The 15 units are:

1. Career Exploration and Decision-Making (Introductory Unit)
2. Decision-Making
3. World of Work
4. Vocational Goals
5. Vocational Interests
6. Work Situations and Adjustment
7. Working Conditions and Physical Demands
8. School Achievement and General Educational Development
9. Aptitudes
10. Work and General Experiences
11. Economic Influences

12. Social and Family Influences
13. Decision-Making and Career Planning
14. Educational Planning
15. Your Future (Summary)

When the student has completed the sequenced units, he will have made a choice for a vocational direction and made related educational decisions.

Efforts during 1971-72 will be directed toward the first four units. Completion of the 15 units is scheduled during the 1974-75 school year.

Supportive Materials

In support of the programmed units, specifically 4-15 (which are the exploration units), AEL will design:

1. A D.O.T. Worker Trait Group File Plan--A filing system categorizing and filing occupational information according to the 114 Worker Trait Groups of the D.O.T.
2. The Keysort Worker Trait Group Reference Index--A keysort card procedure to help students manipulate the occupational information in a consistent, orderly manner. There are 114 cards in the deck, one describing each Worker Trait Group. Since most schools do not have computers available at the present time, in effect, the student does the work of the computer. Each card is punched with the particular characteristics of a single Worker Trait Group. The student, with the Keysort needle, sorts through the deck, based on his particular interests, etc. Those cards relating to characteristics similar to his fall out of the deck, thus identifying those vocational areas he may wish to explore further. He can take these cards, select another variable, and then repeat the process, thus combining two or more worker characteristics.

   By using the Keysort system the student has the means to consider his interests and aptitudes, etc. in identifying those jobs in which he has potential for success. Other influencing factors, where appropriate, will be punched into the Keysort system.

   Since the Keysort permits the student to identify and explore vocations using a multivariable approach, he can sort according to his own priorities.

Additional sources of information relating to the specific Worker Trait Groups may be listed on the back of each Keysort card.

3. VIEW (Vocational Information for Education and Work) is another source of information for students. AEL has developed a deck of about 250 microfilm aperture cards, each of which contains four pages of information about a particular occupation. The student inserts the aperture card into a reader-printer machine. If, after reading about a particular job, he desires a take-home copy, he can obtain a printout. The cards can also be used on a reader machine which does not produce hard copy. The unique feature of this AEL product is the fact that information on sources for training, employment opportunities and salary ranges are presented for both the national and regional-local situations.

To accompany the units and products developed in each component--Career Awareness, Career Orientation, and Career Exploration and Decision-Making--AEL will develop a Utilization and Resource Guide to give teachers and counselors guidelines on the most effective way to use the materials. The Guide also will suggest enrichment activities and experiences which can be used to supplement the AEL materials.

AEL's Career Decision-Making Program is unique in that AEL's approach provides the structure and organization for a student to take the available occupational information system and, through carefully integrated learning experiences, link it to his own characteristics, desires, and capabilities.

EDUTEK* SELF-INSTRUCTIONAL MEDIATED CAREER EDUCATION PROJECT

*Richard L. Douglass***

Introduction

The choice of a career is one of the most important decisions that an individual must make in his life. In our contemporary American society, a great amount of freedom is granted the individual in finding his way through a maze of job possibilities. (Horner, J. T., et al, 1967) The wise choice of an occupation requires accurate information about what occupations are available, what they require and what they have to offer.

Problem

There is a lack of individual access to factual current information needed for career choice, special educational opportunities, and decisions about appropriate training for careers. This void leads to particularly critical problems, especially for the minority or disadvantaged student.

Objectives (First Year)

1. Identify and summarize computerized career guidance systems presently in use.
2. Develop mediated career information materials in the form of 35mm slides and synchronized audiotapes.
3. Design a self-instructional mediated career guidance system which integrates computerized information and mediated presentations.

Project Status

The project staff has reviewed the capabilities, status and availability of existing computerized occupational information systems. These findings are

---

*EDUTEK, Inc., Ninth and Avenue H, 1340 Air Park West, Lincoln, Nebraska 68524.

**Richard L. Douglass is Assistant Professor of Agricultural Education at the University of Nebraska.

being summarized. One or more systems will be recommended for inclusion in the EDUTEK Self-Instructional Mediated Career Guidance System Model.

The principal investigators have developed more than 100 mediated (35mm slide and synchronized audiotape) career information presentations. These presentations have been pilot tested and are currently being refined. Preliminary evaluation of these materials indicates that they can be as effective as the occupational education phase of an excellent group guidance program.

An EDUTEK Self-Instructional Mediated Career Guidance System Model is currently being designed for application in elementary, junior high and senior high schools. The design should provide a capstone to the existing career education curriculum. The system should provide for career education from kindergarten through adulthood; be self-instructionally mediated; appropriate for disadvantaged youth; and not cost more than the school system can afford.

Mediated Career Information Materials

5-7 minute taped interview and 25-35 color slides for:

1. Home Economics Occupations

   Clothes Presser
   Day Care Center Operator
   Dietary Aid
   Dietitian
   Dishwasher
   Fashion Designer
   Interior Designer
   Laundry Worker
   Maid
   Sewing Machine Operator
   Soda Fountain Clerk
   Waitress
   Restaurant Manager

2. Agriculture Occupations

   Agricultural Machine Setup Man
   County Agricultural Agent
   Entomologist
   Farm Hand
   Horticulturist
   Tenant Farmer
   Veterinarian
   Cattle Buyer
   Grain Buyer
   Salesman...Livestock Feed

Feed Mill Worker (sacker)
Salesman...Farm Equipment
Farm Manager
Farm Loan Officer
Salesman...Seed Corn
Rural Gas Delivery Man
Soil Conservationist
Groundskeeper
Agricultural News Editor
Farm Implement Partsman
Vocational Agricultural Teacher
Veterinarian Assistant
Fertilizer Plant Manager
Agricultural Engineer

3. Technical and Building Construction Trades Occupations

Architect
Brickmason
Building Contractor
Building Inspector
Cabinet Maker
Draftsman
Electrician
Jeweler
Plumber
Welder

4. Clerical and Office Occupations

Business College Manager
File Clerk
Fingerprint Technician
Grocery Clerk
Key Punch Operator
Mail Carrier
Office Manager
Secretary
Shipping and Receiving Clerk
Store Clerk

5. Selling and Business Occupations

Auto Dealer
Insurance Agent
Milk Routeman
Owner Advertising Agency
Owner of Business
Radio and T.V. Time Salesman
Supervisor in Retail Store
Traveling Salesman

6. Mechanical and Outdoor Occupations

Archaeologist
Aviation Mechanic
Garage Mechanic
Garbage Collector
Machine Operator
Oceanographer
Park Ranger
Service Station Attendant
Telephone Company Lineman
Television Repairman
Electronic Technologist

7. Science, Engineering and Mathematical Occupations

Accountant
Astronaut
Chemist
Civil Engineer
Metallurgist
Scientist
Space Scientist

8. Health Occupations

Dentist
Hospital Orderly
Medical Lab Technician
Nurses Aide
Pharmacist
Physician
Psychologist
Registered Nurse
Dental Assistant

9. Transportation Occupations

Airplane Pilot
Dock Worker
General Manager, Interstate Shipping
Railroad Engineer
Taxi Driver
Truck Driver

10. Service Occupations

Banker
Barber
College Professor
Clergyman
Cosmetologist
Diplomat
Funeral Director
Janitor

Lawyer
Librarian
Meat Cutter
Policeman
Public School Teacher
Shoeshine Boy
Sociologist
Stock Broker

11. Publishing and Performing Arts Occupations

Musician
Newspaper Columnist
Photographer
Proofreader
Radio Announcer

Interview Questions

We very much appreciate your cooperation in the occupational education activities which we are conducting at the University of Nebraska. The questions we will ask you are contained on this sheet. You might find it helpful to read them over in organizing your thoughts and responses.

1. Would you please describe very briefly your job? What exactly do you do?
2. Are there any specific tools or equipment that you use on your job?
3. How many hours per week do you work?
4. Do you have freedom on the job, or are you under close supervision?
5. What interests, physical requirements, and special abilities are helpful to a person working in this area?
6. What is the minimum education or training required for employment in your job?
7. In what way do you feel your occupation is important in terms of our total society?
8. How do you feel your job compares with other jobs in terms of being able to buy a house and being able to support a family?
9. What are your opportunities for advancement and what is the employment outlook in your occupation?
10. How would a person find job openings in your occupation?
11. What are the disadvantages and the advantages in this occupation?

Thank you. We appreciate your time and cooperation.

References

Douglass, Richard L. "A Pilot Study of the Influence of Mediated Career Information via Significant Others on Aspirations, Understandings and Attitudes of Eighth Grade Students." Unpublished doctoral dissertation, University of Nebraska-Lincoln, 1971.

Horner, James T., James G. Buterbaugh, and J. Judith Carefoot. "Factors Relating to Occupational and Educational Decision-Making of Rural Youth." Report No. 1. Lincoln: Department of Agricultural Education, University of Nebraska, April, 1967.

Zikmund, Dale G. "A Pilot Study to Evaluate the Effect of Mediated Occupational Information on the Aspirations, Understandings and Attitudes of Eighth Grade Students." Unpublished doctoral dissertation, University of Nebraska-Lincoln, 1971.

Computer Involved Guidance Systems

WILLOWBROOK COMPUTERIZED VOCATIONAL INFORMATION SYSTEM (CVIS)

*JoAnn Harris**

Computerized Vocational Information System (CVIS) is a computer-based guidance and administrative system in operation at Willowbrook High School (Villa Park, Illinois), nearby schools in the same county, and approximately thirty sites around the nation. The project, developed and implemented at Willowbrook High School, has been continuously funded since its beginning in January, 1967, by the Illinois State Board of Vocational Education, the high school district, and the local community college. The package of programs described in this report is in the public domain and available to educational, non-profit institutions.

The primary goal of the CVIS Project is to effectively use the computer as an integral part of the guidance process with students in grades 7-12, specifically for self, vocational, and educational exploration. This goal implies the finding of the appropriate role of both the computer and the counselor in the total guidance process in order to maximize the potential of both. It also implies the discovery of those computer capabilities which hold the highest promise for effectiveness in the field of guidance, and learning how to harness these for cost-feasible use in diverse school settings.

The CVIS Project has chosen to use cathode ray tube terminals as the medium for interactive communication between the student and the computer's messages and data files. The student, therefore, interacts with the computer by typing on the keyboard of a cathode ray tube display device. The computer, connected to the student terminal by control boxes and a phone line, "responds" by sending messages or data to the TV-like screen of the terminal. Repeated interaction of this type produces a formalized "conversation." The student

---

**JoAnn Harris is both Director of Guidance and Director of Project CVIS at Willowbrook High School, Villa Park, Illinois.*

also makes use of a printer, which produces a paper copy of any messages or lists which he wishes to keep, and a self-contained audio-filmstrip projector which displays sound filmstrip loops about occupations.

The software of the system is of the type described in the recent NVGA Commission report "Toward Guidelines for Computer Involvement in Guidance" as "direct inquiry with monitoring." This means that the student has direct, immediate access to and control over the system because he is "on-line" as opposed to waiting for paper questionnaire forms to be computer-processed. This categorization also means that the guidance and technical designers of the system have caused it to be programmed in such a way that the computer assumes some formalized mediating functions between the student user and the data files. Examples of such mediating functions are feedback to the student about his achieved grades, measured abilities, and stated interests at various choice points; the reviewing of past exploration on the system; the pointing out of discrepancies; and the "remembering" of a large number of student choices in order to produce a list of occupations or colleges which fit the characteristics stated by the user. The system at different times assumes different modes: on-line data collection about the user; formalized conversation and feedback; data retrieval; and successive narrowing of options based on student selection of desired characteristics.

Let us turn to a more specific description of the capabilities and uses of the CVIS system. At this time the system contains three distinct components: the guidance systems, the administrative system, and the capability for computer-assisted instruction.

The guidance systems serve students at three levels: junior high, secondary, and community college. The junior high system allows a student to assess his own personality, abilities, and interests in light of the six work environments hypothesized by John Holland. The student may explore typical adult occupations in preferred Holland categories by recalling information on the cathode ray tube or by viewing any of the twelve sets of audio filmstrips which have been prepared by the CVIS team. After this exploration, he may begin to take steps toward tentatively chosen goals by using the computer program to plan his selection of freshman high school courses.

The secondary school program offers the student the ability to explore and retrieve specific information about 450 occupations, filed by Roe field

and level. This exploration takes place in context with self-information (grades, measured ability, measured interest) stored in the computerized student record. Seven programs have been developed as logical extensions of self and vocational exploration to assist the student in the next step of planning. These programs provide general information, on-line selection of, and specific information about four-year colleges, community college curricula, specialized and technical schools, military programs, local entry jobs, apprenticeships, and course offerings in the local high school.

The community college program allows the student extensive exploration of his own cumulative record and interpretation of testing instruments in relation to various populations. The other available programs are modifications of those developed for secondary school students, such as exploration of senior transfer institutions instead of four-year colleges.

The CVIS Project has attempted to alleviate the cost problem of computer-assisted guidance systems by including a host of administrative functions which operate simultaneously and on the same terminal devices as the guidance programs. This scheme has proven effective in our own schools because the administrative applications have effected cost savings and have streamlined formerly cumbersome clerical duties. The present administrative programs include: student self-registration; on-line schedule changing; on-line update of the school's master schedule; daily attendance-keeping and attendance reports; state reports in regard to disadvantaged and handicapped students; computerized student records and transcripts; on-line recall and updating of student records in a variety of displays; and a community college registration system.

The third component of the CVIS system, computer-assisted-instruction, is still in its infancy. A basic monitoring program now exists which will control an instructional unit in any subject matter provided that the teacher develops the unit within certain specified parameters. The program allows multiple-choice responses and free response up to twenty characters. The program also provides for monitoring of student progress and for individualized pacing. Currently teachers on the Willowbrook faculty are being taught how to develop instructional units, and approximately forty mini-courses are in stages of progress toward operation.

The CVIS team is currently very highly involved in demonstration and dissemination of its work. Willowbrook High School is a state-supported

demonstration center, hosting hundreds of guests yearly. Information about the project is also disseminated through brochures, journal articles, and a twenty-minute color, sound film, available free of charge to interested school districts. The demonstration center also offers several workshops yearly for guidance, data processing, and administrative personnel who want detailed information necessary for implementing the project in their own environment. Upon formal request, the work of the project is given to educational, non-profit users who have an adequate computer system configuration to support it in the form of an 800-BIP computer tape and a documentation manual.

IBM EDUCATIONAL AND CAREER EXPLORATION SYSTEM (ECES)

*Al Mallory**

ECES is an experimental educational and career information program designed by IBM for the Genesee Intermediate School District as an integral part of a comprehensive career development project. The systematic career development program consists of six phases.

Phase 1--The Introduction

During the introduction, the counselor prepares the student for his sessions on the ECES terminal. The student learns that ECES is a computer-assisted educational and career exploration system which will allow him to explore occupations, majors and related areas of study by interacting with a computer, and then receive personalized information that will clarify his explorations and help him see the relationship between his self-expressed interests, abilities and work values.

Before the student uses ECES, he has taken a special aptitude (VPI) and interest (OVIS) test. He receives these profiles along with a "Search Strategy" which has been printed by the computer as a suggested plan in researching occupations and majors. The counselor and student review the Search Strategy to plan the student's use of ECES. The student record in ECES also includes courses he has taken, grades received and a general learning test score.

Phase 2--Orientation

During the on-line orientation, the student learns how to use the terminal to direct the computer. The student terminal includes a communications terminal and an optical image unit which is simply a viewer. ECES provides a systematic approach to career planning. The student uses an electronic light probe to touch the screen of the optical image display terminal which calls up pictorial

---

**Al Mallory is Director of Vocational Education at the Genesee Intermediate School District, Flint, Michigan.*

information relating to an occupation interesting to him. This visual information is contained in film-strip cartridges which the student inserts into the terminal.

In addition to the student information already stored in the computer, the student will enter his own self estimates of his interests, work values and abilities. He will also have the opportunity while participating in ECES to change any of his self estimates.

During orientation the student also learns about the different charts he can call for that will assist his use and understanding of ECES, and he is taught the relationship between areas of study, occupations and majors.

Phase 3--Exploration

Instructions from the computer program let the user know which cartridge to load after he has indicated with the probe the number of the career or vocation he wishes to explore. In this manner, on-the-job scenes, occupational descriptions and cartoon quizzes on what it's like to work in a specific job are displayed in color. The student can also find out what educational preparation is required to enter a specific occupation, such as high school courses or major areas of study found at the university, trade, or technical school level.

ECES contains four libraries of information. They are:

OCCUPATIONS, which illustrates 400 vocations with 18,000 individual color film images. It also includes more than 1,000 on-the-job pictures showing real work situations, together with 1,000 problem situations which people in those occupations are trying to solve. These work samples give the student a feel for what it's like to engage in occupations that range from botany to bowling machine mechanics.

MAJORS, which describes 400 post-high school areas of study that relate to majors ranging from African Area Studies to Ecology. This section tells the student which high school and college courses are required to qualify for a particular occupation. More than 6,000 courses are thus described.

CHARTS, which helps the student relate his own interests and ambitions to his explorations. Using this section, the student calls up summaries and analyses of each occupation or major investigated. This library also will list other fields the student has not yet explored, but which are related to occupations and majors he said he liked.

INSTITUTIONAL FINDER, which enables the student to search for colleges, junior colleges or vocational and technical schools that offer majors or fields of interest he is considering. Size, geographic location, entrance requirements, tuition, religious affiliation (if any) and housing information on more than 2,000 institutions can be obtained.

Phase 4--Clarification

During the exploration of an occupation or major, the student is continually interacting with the system and entering important data considering his likes and dislikes about the occupation or major. All this information and the information that the student has previously entered into the system is automatically organized and returned in the form of charts whenever the student directs the computer to print the kind of chart or type of analysis he wants.

Phase 5--Discussion

Information on the majors, detailed descriptions of the courses and summaries of the student's explorations are printed on the typewriter terminal at periodic intervals or upon request by the student. These summaries become the basis for the discussion between the student, his counselor and his parents. Together they decide on whether the student could benefit most from more extensive exploration, clarification or more detailed discussion and consideration of the student's possible career alternatives. This phase was the focal point of an inservice training program that provided for systematic training of counselors in interpersonal skills.

Phase 6--Career Planning

Now, the student, his counselor and his parents consider the alternative courses of action available to him. Together they should decide whether the student could learn more by returning to ECES for further explorations or whether he could benefit most by planning a definite course of action that would lead to his career goal. This discussion, then, should lead to the selection of a career objective, the selection of the high school courses required to complete a major area of study, the selection of a post-high school program and a college, if one is required to reach the student's career objective. The overall goal of this systematic approach to career planning is to help the student identify and plan a career goal and then prepare him to meet the educational requirements of his career choice.

IBM ECES: A PRELIMINARY REPORT ON THE FIRST YEAR OF FIELD TRIALS IN GENESEE COUNTY, MICHIGAN

*Roger A. Myers**

In a cooperative research project with the International Business Machines Corporation and the Genesee Intermediate School District, Teachers College, Columbia University provided the team for the assessment of the first phase of the field trial.

ECES was used for a minimum of two two-hour sessions by 10th graders from 13 high schools in Genesee County, Michigan. Each high school whose students used ECES was matched with a control school of approximately equal size, per pupil expenditure, racial balance, location, and socioeconomic level. Data were collected on approximately 3,200 students from experimental schools and 2,400 students from control schools.

In order to assess ECES effects on vocational maturity, the Career Development Inventory (CDI) was developed. Based on data collected in the initial ECES field trial at Montclair, N.J., a 236-item questionnaire was constructed and administered to all experimental and control subjects early in the school year and again near the end of the year. Item analysis and factor analysis permitted the revision of the questionnaire to produce a 93-item instrument yielding scores on three scales and a total. The scales and their constituent subscales included:

Scale	Subscales
A: Planning Orientation	Specificity of planning Self-estimated amount of occupational information Definitiveness of plans Concern with choice
B: Resources for Exploration	Quality of potential resources Quality of used resources
C. Decision Making and Information	Knowledge of decision-making principles Measured occupational information

In addition to the CDI, a number of instruments were constructed for preliminary trial during the first year of the field trial.

**Roger Myers is a Professor of Psychology at Teachers College, Columbia University.*

Findings

1. Analyses of covariance indicated that ECES users in urban schools improved more than non-users in their awareness of occupational resources available and in the quality of resources they actually used. No other differences were observed.
2. Results gathered with a Student Weekly Activities Report indicated that ECES users did not engage in more extra-mural information-seeking behavior than non-users.
3. Attitudes of ECES users were almost totally positive both after the first and after subsequent uses of ECES. Within the context of totally positive attitudes, students in non-urban schools and female students tended to be the most enthusiastic.
4. Parents of ECES users reported highly positive reactions to the experience of their offspring. They further reported that ECES had caused them to be more involved in their son's or daughter's educational and vocational planning.
5. Counselors in the schools reported highly favorable attitudes toward the vocational guidance aspects of their roles both before and after the availability of ECES.
6. Counselors show favorable reactions toward ECES with respect to:
   a. the effects ECES had on their students;
   b. their evaluations of the ECES' hardware, scripts and mechanics; and
   c. the changes which ECES caused in their counseling activities.

The efforts of the initial phase of the field test provided valuable information about use patterns, instruments, and data collection procedures that should be used in subsequent phases of the field test.

References

Forrest, D.J. The construction and validation of an objective measure of vocational maturity for adolescents. Unpublished doctoral dissertation, Teachers College, Columbia University, 1971.

Myers, R.A., Lindeman, R.H., Forrest, D.J., & Super, D.E. Preliminary report: Assessment of the first year of use of the educational and career exploration system in secondary schools of Genesee County, Michigan. New York: Teachers College, Columbia University, 1971.

Thompson, A.S., Lindeman, R.H., Clack, S., & Bohn, M.J., Jr. The educational and career exploration system: Field trial and evaluation in Montclair High School. New York: Teachers College, Columbia University, 1970.

SYSTEM OF INTERACTIVE GUIDANCE AND INFORMATION

*Warren Chapman**

SIGI is a computer-based System of Interactive Guidance and Information. It is in the process of development at Educational Testing Service in Princeton, New Jersey, under the direction of Martin Katz. Junior college students are the target population. Work to date has been supported by grants from the Carnegie Corporation.

Objectives

The main purpose of SIGI is to enhance the student's freedom of choice, to develop his understanding of elements involved in choice, and to increase his competence in the process of making informed and rational career decisions. This process includes his learning to examine himself searchingly, to explore options systematically, to interpret relevant data accurately, and to formulate tentative plans as hypotheses that can be treated realistically. The goal of SIGI is to help the student become—in short--the conscious artist of his own career.

The SIGI System

SIGI consists of four major sections: (1) Values, (2) Information, (3) Prediction, and (4) Planning. It is expected that each section will take about an hour of a student's time for both reading and responding at an interactive terminal. However, if the student were to explore a large number of the branches within each section, to rescale his own values, or to go through the prediction and planning sections for several different occupations, he could easily spend up to eight or ten hours in the system. It is expected that an average use by an inquisitive and thoughtful student should be on the order of six hours.

The Values section. The theory of guidance upon which SIGI is based emphasizes the primacy of individual values. Therefore, values are the heart of the SIGI system, where they serve roughly the same function with

---

**Warren Chapman is a Research Psychologist at Educational Testing Service, Princeton, N.J.*

respect to information retrieval and matching that abilities or worker traits serve in other vocational guidance systems.

The student at the terminal weights each of ten occupational values in accordance with its importance to him. The value is defined, and the student presses a button a number of times to create a bar graph whose length shows the importance he assigns to that value. The ten values are High Income, Prestige, Independence, Altruism, Security, Variety, Leadership, Interest (i.e., the importance of working at an occupation within one's preferred field of interest), Leisure, and Early Entry.

When he has finished the preliminary weighting of his values in this manner, the student plays a specially designed game in which two values compete in a simulated work context. The student "works" at an imaginary job with a fictitious title. In a most pleasing way the "job" features the occupational value that the student had weighted highest. As he "works," he is confronted with a series of problems or opportunities, each featuring a different value. For example, his job may be deficient in prestige or leisure, or he may be tempted by an offer of a job with more income. The student's decision to keep his present job no matter what or to switch to a different job is an indication of the relative importance to him of the two competing values.

At the end of the value game, the student sees a display showing the outcome in the form of a balance scale on which the preferred values are seen outweighing the less desirable competitors. He is also given a display pointing out inconsistencies between the choices he made in the game and the weights he earlier assigned to the values. He may play the game as many times as he wishes.

When ready, the student returns from the game to adjust the weightings previously given the ten values. He is forced to distribute a fixed sum in any manner he chooses among the ten values. Since no occupation in the real world contains all of everything, this distribution forces the student to subtract from a less coveted value in order to retain the desired amount of a more coveted one. The result of these adjustments is a profile representing the student's individual value system.

The Information section. The Information section is devided into two subsections, Locate and Compare. Locate allows the student to retrieve occupations that meet his specifications with respect to his values. He

enters Locate with the five values that he had previously weighted highest, or any five values that he wishes to use. He specifies, on a scale of 1 to 4, or by categorical description, the minimum that he will settle for with respect to opportunity for satisfying each value. When the student has completed his specifications for all five values, the computer retrieves and displays occupations that meet or exceed the specifications. The student may choose different values to search for occupations with different profiles, or he may reduce or increase his specifications to retrieve more or fewer occupations.

The Compare subsection allows the student to find answers to a great variety of questions about any three occupations simultaneously. He may ask about description of the work activities, income, educational requirements, personal satisfactions, conditions of work, or opportunities and outlook. He may freely substitute one occupation for another in the inquiry and ask as few or many questions as he wishes.

The Planning section. The Planning and Prediction sections are both in the process of development.* Like SIGI as a whole, they are based upon the primacy of the student's values. That is, both Planning and Prediction are descriptive rather than prescriptive, and the student is encouraged to examine plans for several different occupations and to ask for predictions with respect to a variety of curricula to arrive at a feasible plan acceptable to him in terms of his values.

The Planning section begins with an occupation tentatively selected by the student. Then, in reverse order, it takes the student through the steps he will have to follow to enter the occupation. For example, if the student is interested in a professional occupation, he begins by deciding whether or not he is willing and able to undertake the necessary amount of education. The last step in planning for that occupation will be selecting the major field at his local junior college to begin the journey. Between these first and last steps, the student may get predictions that will inform him as to the probability of his successfully passing certain key courses or completing his major field. The student may at any time decide that the occupation under scrutiny is not for him and that he wants to start over with

*Completed since this was written.

another occupation. It is expected that, as the number of occupations in storage grows, they can be clustered on the basis of similarity of their value structure so that the student who wishes to do so can plan for occupations that are axiologically related in reference to values.

The Prediction section. Predictions will be in the form of a statement to the student telling him that X number of students out of ten at his local junior college have got a grade of C or better in a certain curriculum (or in a key course) when they entered with test scores and previous marks like his. Thus the prediction is actually an experience statement derived from local data. The predictor variables for each criterion will be the best combination of high school rank, grade point average, and scores on selected tests (e.g., those of the Cooperative Guidance and Placement Program, which was developed by Educational Testing Service for junior colleges). It is hoped that Bayesian techniques can be used to improve the quality of prediction statements in those instances where local data are insufficient.

The Prediction system will be open to the student at all times after the initial run through of all four sections. Then the student can, if he wants, select a major field, look at his prediction for it, and begin his planning from there. Or he can begin with occupations, secure predictions for the related major fields, and then aim at the one where the probability of success seems greatest. The probability statements are always presented as additional information for the student to think about, and he is invited to weigh them in accordance with what he knows about himself.

Hardware

The terminal for the pilot model of SIGI consists of two adjacent screens separated by two columns of six buttons each. The screen to the student's left is for slide projection by means of a random-access carrousel; the one to his right is a Sanders 720 cathode ray tube. The student communicates with the computer by pressing the appropriate buttons. The buttons that have been activated to receive responses in any display are backlit and are aligned with the material to be responded to on either the slide or the CRT. This arrangement has proved to be extremely versatile and flexible. The twelve buttons allow a great variety of potential responses, and backlighting the active buttons has vastly reduced the reading load for the student, who can usually look for the lighted buttons with no more than a glance at

the text. The terminal is driven by a Digital Equipment Corporation PDP 8 computer. However, a PDP 11 has been purchased, and conversion is now under way to the new computer and a new terminal.

Present Status of SIGI

As of October, 1971, the Values section has been completed in a form suitable for formative evaluation. The Information section is on schedule with approximately 100 occupations ready to be inputted, which was the number desired for this stage. Eventually, the Information section will include about two hundred occupations.

The Planning and Prediction sections are being developed specifically for Mercer County Community College in Trenton, New Jersey, the test college for the formative evaluation. It is expected that experience gained in this activity will lead to generalization of the Planning and Prediction sections to accommodate a broad spectrum of colleges. Formative evaluation is scheduled for the late spring and early summer of 1972. About forty MCCC students who have completed high school but who have not yet attended any college will come to Educational Testing Service to interact with SIGI. Experience with these students will guide the revision and expansion of the SIGI script for a summative evaluation in 1973-74 with selected junior colleges. The number and location of the colleges for the summative evaluation will depend on funding.

The major problems confronting SIGI at present have to do with hardware. New developments in terminal design are forcing us to lock in on a terminal configuration much earlier than we expected. SIGI was originally conceived as a stand-alone system that a junior college would buy or lease for its exclusive use. Recent developments have made it feasible to operate terminals at a number of institutions in a region from a centrally located mini-computer. The advantage of this configuration would be a great saving in cost of hardware. To achieve this saving, however, it looks as though the slide projection may have to be sacrificed. Switching from a slide-CRT format to CRT alone constitutes a fundamental change in the SIGI approach, as well as creating problems due to the difficulty of writing script for a display device which is not yet available.

A second difficulty is finding information about occupations with opportunities for social reform or non-standard activities. SIGI's attempt

to match occupations with values rather than abilities or interests imposes an obligation to supply information not found in the Occupational Outlook Handbook or other conventional sources. However, so far our efforts to track down data about legitimate jobs that go counter to the prevailing vocational culture have been sparsely rewarded, and we still have gaps in what we can say to the student at the terminal whose system of values does not fit within the traditional framework.

Finally, of course, is the ubiquitous problem of evaluation. Not only is there the difficulty of finding short-range criteria for assessing long-term outcomes, but also more fundamental problems which make the evaluation of guidance programs especially complex. As Martin Katz has observed with respect to guidance programs, "We see no clear consensus on purposes, there are sharp disagreements on fuzzy criteria, and measures that have been developed so far appear to have validities that are, at best, indeterminate or modest." These problems are uncommonly acute in the evaluation of SIGI because its objective is to develop in the student a wise decision-making process rather than a content that might be called "wise decisions"--decisions which may, indeed, seem wise enough at the time, but which may not look so good when all the long-range and unforeseen consequences are at hand. It turns out to be very hard to devise instruments, tests, interview schedules, and questionnaires which measure more than trivial behavior and which, taken together, indicate whether or not students exhibit competence in the process of wise decision-making. Tentative design and evaluation instruments have been drafted and will be tried out in the summer of 1972. They will be sharpened and revised for the summative evaluation to be conducted later.

Reference

Katz, M. Evaluating guidance--why, what and how. Paper prepared for the 28th Rutgers Guidance Conference, October 1971.

UW/M COMPUTERIZED GUIDANCE PROGRAMS

*Russell N. Cassel**

During the past five years six different but related computerized guidance programs have been developed at the University of Wisconsin-Milwaukee (UWM) largely by personnel of the Educational Psychology Department under the personal direction of Dean Richard Davis, School of Education. The Guidance Department of the Milwaukee Public Schools participated significantly in the development of some of these programs, and continues to serve as the major agency for operational development and testing. The six programs are as follows:

1. DEDEV-Decision Development
2. EDGUID-Educational Guidance
3. VOCGUID-Vocational Guidance
4. PLUDRUG-Drug Abuse Information
5. CASCON-Computer Assist Counseling
6. CASTY-Case Study Analysis

Professional Orientation

The concepts of "counseling" and "guidance" both presume that a person sophisticated in specialized areas of psychology is providing assistance to another person who desires it in relation to some problem. In the case of counseling, the problem has been in some aspect of personal adjustment or reality orientation, and is more external to the individual. In guidance the situation is reversed; the reconciling of external problems to the person being aided is paramount, and the personal adjustment of the individual is subordinate. The UWM Computerized Guidance Programs (UWM CGPs) are not concerned with replacing the counselor in this defined role, but rather in serving as an effective catalyst to bring about these objectives.

Operational Evaluation

Presently all six of the UWM CGPs are in an operational state and are being prepared for a comprehensive functional evaluation at an early date. Some of the major concerns involved in the present operational evaluation are to:

**Russell N. Cassel is a Professor of Educational Psycholcgy at the University of Wisconsin-Milwaukee.*

1. Minimize repetition of client instructions
2. Maximize computerized direction of activities
3. Facilitate integration of various programs
4. Assess psychological completeness of concepts
5. Do any necessary computer debugging

DEDEV-Decision Development

DEDEV--the Computerized Decision Development Program--is designed for use in developing decision making competencies in students relative to five different dimensions:

1. DEDEV-SYSTEM - Principles of systems analysis.
2. DEDEV-VECTOR - Valence and vector analysis.
3. DEDEV-BASPAT - Basic pattern of decision-making
4. DEDEV-PERSUADE - Principles of persuasion.
5. DEDEV-PROFAL - Decision process in professional areas.

Underlying theory. Decision-making is a psychological process which an individual may develop and perfect through learning. Not unlike all other psychological processes, man is not born with the ability (competency as opposed to capability or potential) to make effective decisions, any more than he is born with the ability to do arithmetic or play the piano. Indeed, decision-making represents the most critical of all psychological processes, the one by which tensions are released and personal satisfactions are gained, the single means for goal identification and direction for attainment. But it is, without exception, the most neglected area of human development. Man is a "free will" agent with the capacity for electing choices in relation to all major life activities. Present emphasis on operant conditioning, use of tranquilizers, and certain developments in marketing research serve only to dwarf his personal goal-setting abilities, rob him of all vestiges of dignity and sovereignty, and generally reduce him to a condition of serfdom. Crime and delinquency, abuse of dangerous drugs, dropping out of school, and other similar behavior which serves to prevent the individual from self-fulfillment or self-actualization must be recognized as true errors of decision-making by persons seldom, if ever, provided an opportunity to develop such competencies in any organized fashion. If society is intent on reducing delinquency and crime and the abuse of dangerous drugs, and generally improving the welfare of mankind, it can only be accomplished by improving man's decision-making process.

Gaming and simulation. Each of the five dimensions of decision-making is presented through the traditional Computer Assisted Learning (CAL) approach using the Skinner technique (small bits of information followed by questions that serve to emphasize critical aspects of the presentation). Following such theoretical presentations are a wide variety of gaming and simulation social problems requiring the application of such principles.

EDGUID-Educational Guidance

EDGUID--the Milwaukee Computerized Educational Guidance System--is comprised of three separate parts: (1) high school program selection, (2) post-high school educational offerings, and (3) post-high school scholarship search. Only the section on post-high school educational offerings is presently operational. More than 3,000 post-high school offerings have been programmed into the computer under 14 different options which serve as the basis for search and screening by the student. For the states of Wisconsin and Illinois all post-high offerings are included; while for other states only four-year colleges are provided. The principal objective of EDGUID(2) is to help students narrow their choices, where all post-high school offerings possible are considered in the narrowing process, and with a view towards considering the matter in greater depth at a later interview with the guidance counselor.

VOCGUID-Vocational Guidance

VOCGUID--Milwaukee Computerized Vocational Guidance System--is comprised of three separate means for computerized career planning: (1) a battery of standardized tests (I.Q., reading, and Kuder); (2) a counselor-provided socio-economic index rating and either the Kuder scores or the Dictionary of Occupational Titles (DOT)'s 22 "job skill requirement areas;" and (3) five different search and screening categories--without use of any test scores--i.e., I--Kuder ten interest areas, II--Goodenough six socio-economic areas, III--DOT Data, people or things interest areas, IV--school attainment, and V--DOT 22 job skill requirement areas. More than 800 job career areas, representing the approximately 300 job careers included in the Occupational Outlook Handbook for 1970-71 together with about 500 additional job shred-outs, serve as the basis for job-career screening. The general notion underlying VOCGUID is to help persons narrow career choices from the many to the few, so that these few can be treated in greater depth in face-to-face contact with a guidance counselor.

PLUDRUG--Drug Abuse Information

PLUDRUG--a Computerized Drug Abuse Education Program--seeks to provide the widest possible variety of information bearing on critical aspects of dangerous drug abuse. Such information is planned to be included in an exhaustive and encyclopedic format, so that individuals may elect to include offerings based on their own personal interests. If the program's offerings fail to satisfy these interests, or to keep the promise that the participant thought was implied in the title, he may terminate the offering and proceed to still other choices. Gaming and simulation social problems are included in PLUDRUG whereby individuals face drug abuse situations and are asked to resolve such problems through surrogate role playing. The gaming and simulation problems are paced to two different levels of students: high and junior high. Through this approach teenagers and youth are able to become more involved in surrogate roles experiencing immorality, sex, and intrigue in a few hours than one would expect in an entire lifetime of typical living. Generally, persons work in twos and threes on the consoles, for the discussion adds to the interest of the sessions.

CASCON--Computer Assist Counseling

CASCON--Computer Assist Counseling--is based on the notion that too often individuals are not aware of what is expected socially by the mainstream of society, and that computerized social problems can provide such learning. Here socially simulated problems are programmed into the computer, and participants are asked what the ideal responses to such problems would be. The ideal response programmed as being correct was determined on the basis of responses by several thousands of teenagers and youth, and is sometimes at odds with that expected by the veteran counselor. It is not assumed that knowledge of what is expected by the mainstream of society is any guarantee that such ideal responses will follow. It is, however, assumed that ideal responses can only occur by chance, not by design, if individuals are not aware of what such ideal expectations are. The theory derives from the Christian idea of conscience, and conscience, as defined by Freud, is that aspect of one's psychic structure that pains him when his own behavior is at odds with his personal value system. The ego-ideal is a similar aspect that rewards him. CASCON seeks for conscience and ego-ideal development.

CASTY--Case Study Analysis

CASTY--UWM Computerized Case Study Analysis--has been designed for enriching school psychologist and guidance counselor practicums. It seeks to capture those cases that are appropriate for developing diagnostic competencies in a wide variety of areas essential to mature insights in such disciplines. Such computerized case studies include five separate useful sources of information: (1) personal interview; (2) professional interview; (3) test record; (4) medical record; and (5) anecdotal reports.

References

Cassel, R.N. Computer assist counseling for development of culturally compatible ego-ideal imagery. Psychology in the Schools, 1969, VI(3), 289-291.

Cassel, R.N. Computer Assist Counseling (COASCON), a basic essential in youth correction programs. Journal of Correctional Education, 1969, XXI(2), 21-23.

Cassel, R.N. Systems analysis in our schools and colleges. Education, 1969, 90(1), 18-24.

Cassel, R.N. The counselor's repertoire on approaches to counseling and their suggested uses. Psychology, 1969, 6(4), 54-64.

Cassel, R.N. Delinquency and crime are functions of human decision error. Journal of Correctional Education, 1970, XXII(4), 20-21.

Cassel, R.N. Drug abuse education through computer-based simulation of experiences involved in development of drug dependency. 1970 Congress of Correction Proceedings, The American Correctional Association, Washington, D.C., 1970.

Cassel, R.N. Illegal dangerous drug abuse in Milwaukee county. The Wisconsin Psychologist, 1970, 10(2), 5-9.

Cassel, R.N. Computer Assist Counseling (COASCON). Development and Experiment in College Teaching. CIC Report No. 6, University of Michigan, Ann Arbor, Michigan, Spring, 1970.

Cassel, R.N. The Ego-Ideal and Conscience Development Test, Forms A and B, and Manual. Hollywood, California: Monitor, 1970.

Cassel, R.N. The Drug I.Q. Test, Forms A and B, and Manual. North Quincy, Massachusetts: The Christopher Publishing House, 1971.

Cassel, R.N. Effective correlates of persuasion as depicted by recent research. Psychology, 1971, 8(3).

Cassel, R.N. Critical stages in man's ego-ideal and conscience development. Psychology, 1970, 7(3), 15-25.

Cassel, R.N. Psychological aspects of religion in the life of man. National Catholic Guidance Journal, 1971, 15(3), 205-207.

Cassel, R.N. The Pygmalion of the clinician. World Journal of Psychosynthesis, 1970, 2(8), 43-46.

Cassel, R.N. Computer Assist Counseling by the Systems Analysis Approach. World Journal of Psychosynthesis, 1970, 2(7), 38-41.

Cassel, R.N. Operant conditioning fails to foster self-direction and tends toward enslavement of the individual. Psychology, 1971, 8(2), 22-26.

Cassel, R.N. Computer-based learning programs. Wisconsin Library Bulletin, 1971, 67(3), 143-144.

Cassel, R.N. A proposed experimental secondary school leadership training program for Milwaukee. Adult Leadership, 1971, 19(8), 251-275.

Cassel, R.N. The UWM computerized psychology and guidance programs. Newsletter of the Association for Development of Instructional Systems (ADIS), July, 1971.

Cassel, R.N. Computer orientation. Newsletter of the Association for Development of Instructional Systems (ADIS), 1971, September, 11-16.

Cassel, R.N. Seven different computer-based interaction modes for intellectual and educational development uses. Computers and Automation, 1971 (pending).

Cassel, R.N. Instructional gaming and simulation (pending).

Cassel, R.N., and Blum, L.P. Newsweek, 5 January 1970. Reprinted in Focus on Media, 1970, II(2), The University of Wisconsin-Milwaukee.

Cassel, R.N., and Blum, L.P. Milwaukee school program for the rehabilitation of delinquency prone teenagers and youth. Journal of Correctional Psychology (pending).

Cassel, R.N., and Blum L.P. The school dropout. The Pointer, 1970, 15(2), 52-56.

Cassel, R.N., and Blum, L.P. Computer Assist Counseling (COASCON) for prevention of delinquent behavior among teenagers and youth. Sociology and Social Research, 1969, 54(1), 72-79.

Cassel, R.N., and Lekan, H.A. Basic fundamentals of programmed learning (pending).

Cassel, R.N., and Reier, G.W. Comparative analysis of concurrent and predictive validity for the GATB clerical aptitude test battery. The Journal of Psychology, 1971, 79, 135-140.

IV.

CAREER EDUCATION AND THE TECHNOLOGY OF CAREER DEVELOPMENT

INTRODUCTION

We now come to the nub of the Conference: given the desire and models for career education and given our so far developed technology, how do we create a synergistic union of the two? The union of course ought to take advantage of where we have been but make available what we have in terms of what is wanted. The modification will cost money but at the present time, the U. S. Office of Education wants to buy time with money. The Office intends that there be new models of career development today. What can we do to help the Office have the time it seeks?

Discussion was organized into three areas as indicated below. Several conference members assumed responsibility for summarizing the discussion in each area as also noted below. In each area, the Chairman introduces the subject and integrates remarks at its end.

I. The Basic Functions of an Effective Program for Career Guidance and Counseling: Eugene Wilson, Chairman
   - A. Planning Personal Development - Jewell Boling, Summarizer
   - B. Learning to Manage Personal Development - Robert Campbell, Summarizer

II. Relative Advantages of Available Procedures: Allan Ellis, Chairman
   - A. Career Education and Development Curricula - Dale Prediger, Summarizer
   - B. Integrating Media and Guidance Systems with Other Systems in the School District and Community - Gerald Dudley, Summarizer

III. Implementation Problems: Roger Myers, Chairman
   - A. Counselor and Vocational Educator Acceptance of Systems - Al Mallory, Summarizer
   - B. Training Counselor and Vocational Educator Users - JoAnn Harris, Summarizer
   - C. Managing and Administering the New System - Tommy L. Roberts, Summarizer

The Basic Functions of an Effective Program for Career Guidance and Counseling

INTRODUCTION

*Eugene Wilson**

We have considered computerized, computer-assisted, and computer-free career guidance systems, but what are the basic functions of effective programs for career guidance? Leaving aside the percentiles, the job families, and the problem of entry levels, what are the behaviors that the various systems are trying to elicit? Just as a parent is successful when the child no longer needs him, a career counseling system is successful when the individual is able to function without it, when the making and carrying out of career decisions, the planning and managment of personal development, have been introjected and made part of the student's pattern of feeling and behavior. Dr. Boling and Dr. Campbell will summarize our findings on the planning and management of personal development.

**Dr. Eugene Wilson is President of Interactive Education, Inc., a Prentice-Hall Company, Englewood Cliffs, New Jersey.*

PLANNING PERSONAL DEVELOPMENT AS CONSIDERED IN THE CONFERENCE AND THE UNITED STATES TRAINING AND EMPLOYMENT SERVICE

*Jewell Boling**

The sessions of the Conference focused on today's immediate problems in career education and development; namely:

1. the existence of a Federal policy to institute new models of career education and development
2. the availability and usability of existing materials and ideas in career education and development
3. the instructional and counseling programs under development and/or tryout whose aim is to aid individuals in selecting personally relevant, long-range goals.

Dr. Rue Harris first spoke on the overall topic of career development and the reasons why the Office of Education is funding the development of the various new "models" of career education and development. Dr. Harris made specific a philosophical and practical definition of "career development." It is development in relation to the total life of the individual. It is total development, social, emotional, intellectual, and physical. It encompasses vocation, leisure, interests, values, and all areas of life's activities. This concept, expressed variously, held through all the later presentations of projects and studies by the other conference participants.

Some Dimensions of Career Development

Career development is concerned with helping the person to become a part of a work-oriented society and to negotiate himself through life. It is self development and self actualization. It is preparation to be alive with

---

**Jewell Boling is a Manpower-Development Specialist with the U. S. Department of Labor, Washington, D. C.*

active heart, mind, and hands. Career development is to develop a self concept, attain a value system which gives one personal stability, choose a life style in keeping with one's own personal lines, and acquire a vocational identity. In the course of this development the individual learns how to perceive the world, how to make a valid assessment of it and his experiences in it, and how to function as a rational decision maker. He learns to recognize the choice points in life and to foresee the consequences of his choices.

Career development is awareness. It is economic awareness, a feel for the economy. It is civic awareness, with developed sense of responsibility towards society and self. It is tool and process awareness, skill awareness. It is awareness through all the ways in which we extend ourselves, through language, crafts, space, arts, culture, senses, and cause and effect relationships. It involves cognitive competence: communication skills (verbal, reading and writing), quantitative skills, skills of problem solving, skills of logic, and the art of rational planning. It involves competence in managing personal affairs and competence in managing social relationships. Career development is understanding the personal, social, and economic significance of work and individual differences of occupations in relation to these dimensions. It involves knowledge of self in relation to work and what work has to offer. It involves the acquisition of the skills and attitudes of employability.

New Approaches to Career Education and Development

We live in a work oriented society. American society cherishes the value of formal education as a means of entrance into and mobility throughout the world of work. In this context the school has become the primary bridge between learning and earning. Indeed the educational Establishment has monopolized the distribution of work opportunity. Yet many people in our society exhibit an inability, or feel an inability, to make it within the system. Many of these people seem not to make it because they have not acquired through the educational system the social and personal skills which the world of work expects of them. Many have become alienated from the work world and seek to "negotiate" existence on some other basis, e.g., welfare, illegal pursuits, etc. Even though the years of schooling which the average

white American has had is 12.4 and the nonwhite American 11.3, a study published in 1970 by the Harvard Educational Review and affirmed in correctness by officials of the Office of Education, states that over half of the adults in the United States today may lack the literacy necessary to master day-to-day reading matter such as newspapers and job applications.

Clearly there is a need for new approaches to helping people to "negotiate" their existence, their career development. Among the critics of educational relevance for career (i.e., life) development is Charles Silberman who advocates reform of the present educational establishment. More radical, and perhaps more influential, is the view of Ivan Illich, noted for his research on institutional alternatives in a technological society. Illich opts for "deschooling" society and calls for reform so extreme that laws would be passed forbidding discrimination on the basis of prior schooling.

Another force pointing to alternatives to traditional education is the demand for individualized instruction. Individualized instruction does not mean a one-to-one teacher-student relationship, but it does mean taking into account some of the idiosyncrasies of the individual, his learning speed, his strengths and weaknesses, and tailoring his curriculum more to his individual needs. In the past, education has been largely geared to standardization. But as Alvin Toffler points out in Future Shock, standardization is the earmark of a primitive society. In sophisticated societies the emphasis is upon diversity.

Below is a brief description of the four models of career education and development which at the present time are being funded by the Office of Education. These models have as a goal some alternatives to conventional approaches to career education and development. They have been influenced in design by some of the inadequacies of conventional systems.

The School-Based Model

The school-based model approaches education not just as "education" but as "education for something." It is comprehensive and encompasses cultural development as life development. It extends to helping the individual learn how to negotiate himself through life, how to achieve the things he wants out of life. It is development of the individual's purposes and goals which are his "career development." Under this model the individual leaves high

school prepared (1) to advance to higher education or (2) to take a job which he will be prepared to enter. The school will assume 100% responsibility for placement, either for additional training or for a job, of all graduates.

The Employer-Based Model

The employer-based model in a sense is a pragmatic response to Ivan Illich's criticisms. Of course, it is also a response to other demands being made upon career education and development.

The employer-based model is an alternative, a new option. The educational programs will be designed and operated by different groups of businesses. In this model employers will be in charge of an entire school operation and will provide all the education necessary for a high school diploma. The education takes place on the business site. Although designed to provide a constructive alternative to "dropping out" the approach is not to be thought of as a watered-down program for underachievers. The diploma received is to be as acceptable for all purposes as that from a regular high school. The employer-based model is truly a new way of looking at education. In this program the student is never asked to learn something now because he will see the need for it later. All his learning is organized around concepts he will be able to use immediately in his job. He is never exposed to theory before he has encountered the job problem to which theory might apply. This is not to be confused with skill training. The old style skill or vocational training may not be a good vehicle for equalization of opportunity.

Employer-based training is career education in its broadest sense. It simply differs in the manner in which learning is generated. For example, history, language arts, research, and speech could all be taught simultaneously by asking a student to prepare a television special on the historical background for a breaking news story. In the employer-based model, teachers will be drawn from the businesses themselves, from the community of teachers, or from leaders in the area. By this method, students can be offered a wider variety of teachers than is presently available under the certification restrictions of the public school system.

The Community-Based Model

This model is still very much in the planning stage. It is thought of as a model whereby various community institutions might collaborate to provide educational experiences which might lead to student outcomes comparable to those of the employer-based model.

The Home-Based Model

The home-based model relies heavily upon educational TV. It is just getting under way. It is strongly supported by Women's Lib.

Other Models - The Employability Development Model

The employability development model of the United States Training and Employment Service aims to achieve somewhat the same purpose as the models described above, except that it is aimed at a special clientele and might be considered in some respects to be a therapeutic (i.e., treatment) model rather than a developmental model. The clientele is composed primarily of people who are handicapped by a wide variety of disadvantages in obtaining employment. These people are considered to be the least employable in the society, having multiple problems which constitute barriers to employment. These barriers may include physical, personal, and social handicaps, lack of skill training and inadequate basic education, and poor attitudes towards self, others, and the world of work. Included in this clientele are the urban ghetto dwellers, the educationally deficient, welfare recipients, prison releasees, drug addicts, alcoholics, and persons with various behavior disorders. Such applicants are assisted by an employability development team to formulate a complete employability plan involving remedial education, orientation to work, skill training, and supportive services, all leading finally to job placement. Stress is laid upon methods of assessment of individual differences relevant to occupational adjustment and the requirements of various occupations in terms of aptitudes, interests, and training.

Career Education and Development Systems Under Construction and/or Tryout

A number of career education and development systems are under construction and/or tryout across the country. Organizations which are developing such systems include universities, foundations, laboratories, institutes, etc. Among the systems described are the Indiana Resource Center, the Comprehensive Career Guidance System of AIR, Operation Guidance of Ohio State University, SIGI of the Educational Testing Service, the Self-Instructional Mediated Career Education Project, the Career Decision-Making Program of Appalachia Educational Laboratory, VIEW (Vocational Information for Education and Work), Project PLAN, and the Educational and Career Exploration System. Some of these systems make possible individualized career education and development via scripts stored in a computer. The information contained in the scripts is made available to the individual through person-computer interactive procedures.

In common, these various systems require, and make use of or develop, resources which can be used to aid the individual in self-appraisal or assessment and to help him relate his interests, values, etc., to the world of work.

Need for Personalized Career Information

One great problem is that the career or occupational information available today is chiefly task-oriented and geared almost entirely to the economic side of work. Career and occupational information which is personalized, hence having relevancy in the social, cultural, and emotional dimensions, is the exception. Yet, if achieving vocational identity in a career development process is viewed as relating to total development, the social, emotional, intellectual, and physical, then these other dimensions beyond the economic in which occupations can meet people's needs must be considered. People want to know what jobs are really about. They want information which is more honest, less phony. For the information to be relevant to them, it should be related to the human element rather than presented as dry, boring task-oriented narrative. People want to be told what they can do rather than what they cannot do. They want information upon which they can reflect and think "This could be me," "I could be this," or "That's for me." Martin Katz of Educational Testing Service is developing personalized career information for SIGI which emphasizes the primacy of individual values. The U. S. Department of Labor's "Counselor Handbook" presents career and occupational information in a personalized style.

Planning Personal Development

Planning personal development may take place in the educational or the work setting.

An example of planning personal development in the work setting is the program of the United States Training and Employment Service. In this program all employees may develop a "personal improvement profile" for the purpose of planning personal development on both a short- and a long-range basis. The employee is assisted in this by his supervisor and by counseling available in the staff development program. This program serves as a means of enhancing the chances for employees to attain the career goals of their choice. The profile is intended to give a total picture of an employee from the standpoint of his career aspirations. It includes information on the employee's interests, values, life-style preference, aptitudes, non-work activities and accomplishments, and aspirations as well as background information such as education and work experience. The completed profile includes a statement of the employee's goals and United States Training and Employment Service and outside programs that can aid the employee in attaining his goals. In planning self-development and developing material for a personal improvement profile, the employee is urged to actively engage in self-examination and occupational orientation. He is encouraged to take a personal inventory of the circumstances and events centering around his growth and development. Secondly, he is to explore and take stock of his interests, aptitudes, value system, motivations, temperamental tendencies, and his general concept of self and life-style requirements in relation to what occupations may require of him and offer as rewards to him.

The personal inventory is an account of the employee's background experience and accomplishments, centering around his growth and development from the standpoint of career development. It helps the employee to know himself. It helps others to know him. It should bring to the employee awareness of the various directions in which he has moved, the critical decisions he has taken from time to time, and the manner in which circumstances, events, and his own motivations have combined to mold him into the person he is.

To make suitable career decisions, the person should do more than objectively inventory what he has done and accomplished. He needs to go beyond this and find answers to three questions, "What do I really want to do?" "Who do I want to be?" and "What do I have the potential to do and be?" To go about answering these questions the person must explore himself and learn more about his abilities

and aptitudes, interests and inclinations, his temperamental proclivities. He needs to attain a clear sense of his identity, an accurate self concept, and to understand how his career decisions can lead to the fulfillment of his values, provide the kind of life style he seeks, and enable him to play the kind of role he wants to play.

The employee will also need to know himself well enough to estimate whether he has the capacities to be successful in meeting the requirements of the occupations of his choice. As an employee engages in the process of deciding about his occupational and training plans, he should think not only in terms of the immediate future but the terminal or end goals possible in a career field. He should determine his motivations and needs as best he can, so that his choice is not merely a rational one which fits his qualifications to the requirements of an occupation, but a career decision which takes into account all his career needs--economic needs, social needs, and self needs.

This approach to planning personal development can be contrasted with a design intended primarily for an educational setting. One such design is that of the Comprehensive Career Guidance System of the American Institutes for Research. The CCGS proposes to assist students in preparing for life roles and activities that will be both meaningful and satisfying to them. This system organizes a framework for planning personal development which includes the following areas: Vocational, Educational, Personal-Social, Academic-Learning, Citizenship, and Leisure.

An individual in planning his personal development, i.e., exploring and choosing in relation to occupational, leisure-time, cultural, and recreational activities, should assess himself on variables such as his developed abilities, aptitudes, interests, job and college characteristics preferences, and physical and social characteristics; obtain information about educational and occupational alternatives; and employ a strategy for processing this information into personal goals, plans, and actions. He first should know the present developmental status of his personal characteristics relative to educational and occupational alternatives. For test information to be meaningful to him, he should be able to relate the test information to some of the opportunities open to him and make thoughtful interpretations of the predictive power of the tests. He should have accurate information on the patterns of individual differences

that are predictive of career success. He should have specific and current information about school options available. He should be able to relate appraisal of his own personal characteristics to information about aspects of educational and occupational opportunities such as requirements, conditions of work and study, and personal and social consequences.

To plan personal development in this way requires proficiency in the problem-solving skills which enable a person to process information about himself (related to various educational and occupational alternatives) into short-term and long-range goals, and into plans of action for achieving them. The Comprehensive Career Guidance System has developed a model for Educational and Vocational Guidance, which consists of six problem-solving skill areas: 1) Understanding the Problem, 2) Searching for and Using Information, 3) Getting Alternatives, 4) Selecting Goals and Making Plans, 5) Carrying Out Plans, and 6) Finding Out If It Works.

In the discussion centering about the process of personal development as provided for in the various career education and development system presented, the point was made that we can become so enamored of the idea of science and system that we think personal and career development can be achieved through system and procedures, forgetting that the developmental process takes place only as the information is internalized by the person. This is not the result of the procedures, but of the extent to which the information, being relevant to the self needs of the individual, actually leads to his growth and development.

When the computer is made the instrument of information dissemination, the recipient of the information must always keep in mind the partial nature of the information which the computer is able to purvey. The famous Polanyi statement, "Man can know more than he can tell" was quoted in relation to the point that we know much which we cannot make explicit and the computer can only deal with that which can be made explicit. Admitting this, some in the group felt that we should follow the scientific route which recognizes only knowledge which can be made explicit, whereas others argued that explicit information alone gives only a partial picture of the real world. To consider merely the explicit is to consider merely a part of the whole. And as Peter F. Drucker has said, things do not hang separately but together and they must "always be seen together to be seen at all."

Comments

Weakness of all models in recognizing the value systems of minority cultures in relation to development. Lacking in all models mentioned above is a recognition of the importance to minority cultures of their own cultural values in development. There is danger of molding people by our educational and counseling processes into the kinds of people who would fit the prevailing definition of what constitutes a well-adjusted mainstream American at the expense of permitting adequate play of tradition and life style of such minority cultures as that of the Indian, Puerto Rican, Chicano, Cajun, Mennonite, or whatever. It seems that any definition of career development so broad as to include life development should recognize and evaluate the importance of the cultural value system or the ethnic inheritance. It is not too far-fetched to say that what may be regarded as "poor attitude towards the world" by the mainstream culture may be the genuine reason for being and feeling to an ethnic reared in a different cultural environment.

The following comments relate to what appear to be inadequacies in United States Training and Employment Service programs, when considered in relation to the entire career education and development movement in the United States today.

1. Lack of a definite program to provide a computer-assisted counseling and guidance component in the United States Training and Employment Services program to computerize the employment service.

A number of organizations are engaged in constructing systems providing vocational information for education and work. Some of these systems are computer assisted. Others are not. United States Training and Employment Service has under development a program to computerize its operations and it is in fact one of the most far-reaching systems in the field of automated personnel procedures. However, the entire array of "matching" experimentation going on is geared to screening strategies for the purpose of competitive ranking of people (according to one criterion or another). None of this work is geared to the processes which are involved in career counseling. In these matching approaches the emphasis is upon static assessment, that is, jobs and people are processed by the system and decision-making is a function of the system based on its processing of the data, not on a decision-making process on the part of the person. It is, in other words, assessment for selection, not assessment for choice. Yet

President Nixon has stressed the need "to tailor government aid to individual need, to enable each individual to take part in a sequence of activities tailored to his unique needs to prepare for and secure a good job."

2. Narrowing the scope of appraisal or assessment to measurements data.

Whereas the systems under construction for career education and development by other organizations are all broadening the range of variables which are being considered in appraisal or assessment and more and more aiming towards considering the whole person, the United States Training and Employment Service definition of appraisal or assessment has been so narrowed that measurement information is the only basis upon which assessment is made. Formerly, according to the Counseling Manual, appraisal was presented as including the individual's skills, potentialities, interests, temperament, and values, all considered in relation to his self concept. Measurement information was only one aspect of a much broader picture whose aim was to reflect the whole person.

Now the Generalist's Handbook states the following:

> Assessment, as used in the Employment Service, is a broad term which covers the use of various test and nontest instruments by the counselor in appraising various characteristics of a counselee and in interpreting and evaluating them as to their implications for suitable jobs or training needs. The Employment Service counselor uses a variety of assessment instruments, such as:
>
> --General Aptitude Test Battery (GATB)
> --reading and arithmetic achievement tests
> --interest inventories (ICL and Kuder Preference)
> --work sample exercises
> --Nonreading Aptitude Test Battery (NATB)
> --Basic Occupational Literacy Test (BOLT)
> --Specific Aptitude Test Batteries (SATB's)
> --clerical skills tests

As stated, this narrowing of assessment is in contrast to the broadening of the elements of assessment as that activity takes place in the various career development systems under construction, as for example, the Educational Testing Service system which provides for the consideration of values in

decision-making and occupational choice. As stated by ETS, the person "is helped to prove the value dimensions relevant to a decision. For example, how important in his choice of an occupation is making a lot of money? the opportunity to help others? freedom to make decisions? prestige? security? variety? leadership and responsibility? interest in the work activities? leisure? early entry and low investment? ... the value system helps him to learn what he wants, what satisfactions he seeks, and what is important to him."

There seems to be a great need in the United States Training and Employment Service for a systematic approach to a broadened concept of assessment which is adequate to give some expression to people's values, social and emotional characteristics, and life-style preferences, rather than just an array of test scores.

LEARNING TO MANAGE PERSONAL DEVELOPMENT

*Robert E. Campbell**

My assignment as summarizer involves two functions relevant to the topic "learning to manage personal development": (1) Summarizing what has transpired at the conference and (2) Raising discussion questions.

So that we will have a meaningful frame of reference for what is meant by "learning to manage personal development," the following career guidance developmental objective (taken from a series of illustrative objectives for senior high school) is suggested:

> THE STUDENT ACHIEVES A STATE OF SELF-RESOURCEFULNESS FOR VOCATIONAL PLANNING:

The purpose of this objective is to help students become self-directed and self-reliant in their educational and vocational planning. This is not to suggest that students will no longer seek help from others with their vocational problems, but that they acquire a knowledge of resources which will allow them to cope with vocational planning in a sophisticated and intelligent manner. The intent of the objective is consistent with most developmental programs--to gradually decrease dependence and increase independence. The objective is similar to Tiedeman's "sense of agency" (1968) in that the student progressively becomes more responsible for charting his own course and that he sees himself as an active agent in determining the course of his own career. Most of the foregoing objectives contribute to this condition. As students achieve the previous developmental tasks, they accumulate a body of knowledge and experience which can be applied to future vocational events and which progressively allows the student to develop self-reliance. Tiedeman observes that "many persons, especially those in economically depressed areas who have been socially and culturally deprived, may lack this sense of agency because of a lack of accurate information about themselves and their real ability to act on their environment."

**Robert E. Campbell is Chairman of the Vocational Development and Adjustment Programs at the Center for Vocational and Technical Education, The Ohio State University, as well as an Associate Professor of Psychology.*

Sub-objectives

The student demonstrates the personal utility of career guidance resources.

The student demonstrates initiative in developing and implementing his vocational and educational plans.

The student demonstrates the capability to redirect his vocational plans by using the appropriate vocational information resources and to outline a realistic alternate vocational plan.

[Campbell, R. E., et al. The Systems Approach: An Emerging Behavioral Model for Career Guidance. The Center for Vocational and Technical Education, The Ohio State University, Columbus, Ohio, April, 1971, p. 167.]

Collectively, the projects represented by this Conference have suggested a number of related learning experiences and behavioral outcomes (e.g, skills and human conditions) which contribute to this basic function. These include self-actualization, life education skills, social skills, decision-making skills, self-reliance, and skills needed for the exploration and application of information to personal life-career decisions, articulating values and coping with the labor market. It was also facetiously implied that as a student gains interactive experience with computer systems he will learn how to manipulate the computer and beat the system. The latter suggests an ever-increasing need for people as systems to cope with systems (i.e., personal systems in confrontation with organizational systems). It was also suggested that in the analysis of person-system interaction, there is the danger of a creeping psychopathological syndrome labeled "terminal illness." One of the symptoms of "terminal illness" is excessive student dependence on a computer system thereby sacrificing self-reliance. Several participants have warned of this danger and are planning to take preventive steps to short-circuit the pathology.

DISCUSSION QUESTIONS: Based upon what has transpired in this conference relevant to "personal management" several questions appear to be legitimate in terms of the efficacy of current projects in achieving their expressed student behaviors.

1. At what developmental age do we begin to introduce learning experiences which lead to planning and management behaviors? Super's ninth grade study as well as others has emphasized the readiness for "vocational planning and looking

ahead" (but not occupational choice) as a critical junior high school behavior which has implications for later vocational maturity. Is this early enough or is there evidence to support the introduction of these experiences during the elementary grades?

2. What kind of learning experiences are needed to teach personal management and, secondly, what teaching techniques are needed?

3. Although many projects have reported that they intend to teach vocational planning skills (e.g., social skills and decision-making) as part of formal education, how can we insure that these skills will transfer and have utility in later life after the student has been released by formal education?

4. Many of the projects and career education models have assumed that the role of work and the Protestant Ethic will be stable in our society. There is some indirect evidence that this assumption is questionable and some erosion of these societal beliefs is occurring, as evidenced by anti-work feelings of the new generation, surplus labor force, and increasing dependence on technology.

INTEGRATION

*Eugene Wilson**

The papers you have just heard discussed the basic functions of the new career guidance and counseling programs--helping the student to make choices and to implement his decisions, to plan and manage his own personal development. Career guidance is not a static assessment but the fostering of a growth process. Dr. Boling summarized various career guidance systems' approach to the planning function, including in her discussion the Office of Education's four models of career education and development: the School-Based Model which prepares the student either for higher education or for immediate job entry; the Employer-Based Model, in which a high school diploma is earned on the job, and teachers are drawn in part from the ranks of business and local leaders; the Community-Based Model, which depends on collaboration between community institutions; and the Home-Based Model, which will rely mainly on television. She also considered the government's employability development model for persons marginally employable, and the program of the United States Training and Employment Service, designed for all government employees. Among private counseling plans she discussed AIR's Comprehensive Career Guidance System.

She found a need for career education that would deal with the personal values and meaning of the various career paths, and for career education that would consider the role as well as the goal. The objective is not only one of fitting the individual's abilities to those required by a job, but of helping him find an occupational way of life to which he can give a personal allegiance.

Dr. Campbell feels that learning to manage personal development involves a state of self-resourcefulness, a progressive acceptance of responsibility for determining one's own career development. This process, once begun, is often self-perpetuating as the student finds that setting and achieving intermediate objectives is within his capability. Dr. Campbell ends by raising questions for future discussion: At what age should education looking toward career planning and management begin? How can management be taught? Will the planning skills learned in the schools carry over into later life? And he ends with what

---

**Dr. Eugene Wilson is President of Interactive Education, Inc., a Prentice-Hall Company, Englewood Cliffs, New Jersey.*

may be the most fundamental question of all--will the work ethic continue to be the basis for American life, or will it be superseded by other value systems? Will we, sometime, be matching not students and jobs but students and life styles, students and philosophies, students and the various routes to happiness?

Relative Advantages of Available Procedures

INTRODUCTION

*Allan B. Ellis**

Builders of models of career education face a peculiar problem much like the problem once faced by I. A. Richards, the eminent language scholar. Richards had just completed a new poem and, having in mind two titles for the poem, he now had the problem of choosing between them. The more he reread his work the more he saw that choosing was an impossible task because, while seemingly appropriate in itself, each title in the face of the other left something important unsaid. In the end, Richards solved his problem by using both titles, calling his poem Harvard Yard in April: April in Harvard Yard.

At the literal level of meaning, Richards' problem concerned whether institutions contain the seasons that come and go, or whether the seasons encompass institutions and the people that inhabit them. For the career education model builder, the problem is similar although probably more complicated. To begin with, like the seasons, "career" itself is best viewed as something internal to a human being--a state of being--and at the same time something that encompasses a person: that is why it makes sense to speak of career as the time-extended working out of self. But complicating the matter is the fact that any effort to construct a career education model must come to terms with the real world within (or around) which the model is to function. From the beginning, for instance, the builder must deal with the extent to which his model will make use of existing mechanisms as well as the extent to which the model intends to reshape or reestablish these mechanisms.

Naturally each model must attempt to do both and, therefore, our concern with "available procedures," as Gerald Dudley and Dale Prediger will show, must include not only the potential usefulness of such procedures but also their susceptibility to alteration. Thus a consideration of the relative advantages of available procedures to the functioning of models of career education boils down to the question of integration where, as David Tiedeman might say, a model and its setting collaborate to contain each other.

**Allan B. Ellis is President of Educational Research Corporation, 55 Chapel St., Newton, Massachusetts 02160.*

CAREER EDUCATION AND DEVELOPMENT CURRICULA

*Dale Prediger**

Although my topic is "Relative Advantages of Available Procedures for Career Education and Development Curricula," I'm tempted to react, instead, to some of the previous comments concerning career decision making. A lot has been said, both here and in the literature, about career decision making as a rational process. Well, I recall hearing back in grad school that Freud was a great believer in rational decision making--except for important decisions--such as choosing a wife and choosing an occupation. Whether one marries a woman, a job, or both, the impact on one's need fulfillment, life style, and career is too great for the decision to be based on rational thinking alone. We all know that. We have been talking for some time about "implementing one's self-concept" through work, about "psychosocial aspects of jobs," and about "vicarious exploration." I would just like to emphasize that we who are working on systems for career exploration must continually strive to make a place for the irrationality of human goals, values, and emotion in the rational systems we design. I hope we can pursue this topic further later this afternoon.

With respect to Conference discussion of the relative advantages of available procedures for career development, I have two main points of concern and one comment on tactics.

1. Are we ready to accept the key role that vocational education can play in career development?

Vocational education has been a dumping ground for the rejects of academic education for as long as vocational education has been around. Recently,

---

**Dale Prediger is Director of Development Research at the American College Testing Program, Iowa City, Iowa.*

however, it has achieved new status among the pedagogues--that of whipping boy. We hear that vocational education is narrow, rigid, seldom available, inadequate to today's needs, etc., etc. Now, this is not news to vocational educators. They, along with friends in Congress, have recognized the weaknesses in vocational education as it is frequently implemented, and they have been attempting to do something about it. That's why we have the Vocational Education Act of 1963, the 1968 Amendments, and the current legislation before Congress. The reaction of "mainstream educators"--from the USOE to the local school system--has been curious, however. It has been so curious that Kenneth Hoyt has given it a name--"vocational educationalism"--a name similar in meaning and impact to racism.

In looking back on this Conference, I find the scant mention made of vocational education to be striking. The attention it did receive tended to be negative. Now, I know that the Model I people like John Odgers at the Ohio State Center fully realize the major role that vocational education, and the companion program industrial arts, can play in career development. They will, I am sure, draw fully on this resource in developing the School-based Career Education Model. However, the rest of us who are thinking, talking and developing career guidance systems had better not forget that vocational education potentially represents to America's youth the one universally available opportunity for hands-on experience in career exploration and vocational preparation.

My second point applies chiefly to the Employer-based Career Education Model and, I guess, simply echoes a concern expressed by Rue Harris yesterday, i.e.,--

2. How will Model II make use of currently-functioning employer-based programs, and how will it improve upon them?

Goodness knows, we've looked to employers before for help with the career development of youth. A partial list of programs readily shows how hard we have looked. We've had the Manpower Development and Training Act, the Neighborhood Youth Corps, the Work Incentive Program, the Concentrated Employment Program, the JOBS Program, and so on. Schools have had their share of "employer-based" programs, too. They've usually been called co-op programs and typically give employers the major responsibility for developing employability and job skills. Possibly, the fact that the related educational work provided in these co-op programs takes place in the school room rather than the plant .

cafeteria makes the programs "school-based." But the core of these programs is job experience--job experience which is used as a vehicle for education and career development. I hope that Model II doesn't ignore these existing resources and the accumulated experience they represent.

My third point, more a comment on tactics than strategy, relates to the occupational structure on which career exploration and preparation activities will be built. That is--

3. To what degree will the Career Education Models be structured around the 15 USOE Career Clusters?

I think it would be a shame if career exploration and preparation is locked exclusively to these clusters. The clusters are industry-based and are possibly suitable for exploratory activities in the elementary grades. However, psychologically-based career clusters would appear to be much more useful for career exploration among older students. Job preparation curricula could be based on a combination of the two approaches.

There are a number of psychologically-based career clusters currently available. Probably the one that rests most firmly on empirical data is the Project TALENT grouping discussed yesterday afternoon. The DOT Worker Trait Group appraoch was also mentioned yesterday. Other groupings include those developed by Roe, Super, and Holland. At the American College Testing Program, we are currently working on a job cluster system that will synthesize previous thinking and empirical data into what, hopefully, will be a coherent and comprehensive whole. The Center for Occupational Education at North Carolina University is currently developing a data collection and analysis technique that will result in job clusters suitable for construction of vocational-technical education curricula.

Clearly, there are many options available for career clustering. I hope that the best approach for a given purpose and age level will be a subject of study as the Career Education Models are developed.

INTEGRATING MEDIA AND GUIDANCE SYSTEMS WITH OTHER SYSTEMS IN THE SCHOOL DISTRICT AND COMMUNITY

*Gerald Dudley**

A look at the past experiences of introducing new ideas into the educational mainstream may be a sobering one, for few unique innovations have been accepted with open arms. It took the scare of space technology to open the school doors to the helping professions. Even now, with reduced amounts of available funds the necessity for guidance services is carefully scrutinized in many locales. Team teaching, individualized instruction, grouping procedures, teaching machines and an endless list of educational panaceas have been introduced and have quickly faded. Are the media and guidance systems which form the focus of this conference to receive the same fate?

It is my opinion that they may not be well received unless a broad base of understanding is achieved among educators and community officials regarding career education. The present attitude regarding education for careers among educational professionals is a carry-over from the Sputnik era. If a student can be identified as a talented student, he most likely is "counseled toward" (an antithetic idea) college. Any non-talented student is likely to have counselor support and "counseling into" an appropriate job. If career education is to take its rightful place in the lives of individuals, an awareness must be created that career development is a lifelong process that includes the element of education. Rather than the goal of a college diploma for a diploma's sake only, the value of any educational attainment needs to be based upon its relevance to an individual's career. Attitude development among professional educators has always been difficult, but has been most effective in the past when supplemented with federal legislation and funding. The new Career Education Models may provide the needed thrust for necessary attitude changes.

**Gerald Dudley is Associate Director of Research Publications at the Indiana Career Resource Center, South Bend, Indiana.*

The process through which systems of media and guidance are introduced to a community will become most important. There must be a partnership of efforts between the model builders and the model implementors. No longer can we afford a laboratory development of equipment and techniques isolated from the grass roots recipient. Teachers, counselors, administrators, business and industry leaders, and institutional representatives need a communication link if career education programs are to be successful. The idea of the local establishment of active community centers for career resources may be an important concept to influence positive communication.

At the present time vocational training and career intervention procedures are focused at the secondary school level. If a functioning system is to be properly implemented, means must be considered for beginning a systems approach at the elementary school level, extending into other community agencies and into later adult institutions to assist with career decision-making along a life continuum. A plea is also made for humanizing any guidance system under consideration. No system can stand without the human complement. An umbilical computer terminal should not be the sole career development nurturance provided in a developmental process.

As a last thought, it might be helpful if some standardization of concepts could be considered as we discuss career clusters or career families. The future development of compatible guidance systems may rest upon an ability to agree upon the criterion variables around which jobs may be clustered.

INTEGRATION

*Allan B. Ellis**

Since we mean to build Career Education Models that really work, the remarks of Mr. Dudley and Mr. Prediger are very important ones for us to hear because these remarks suggest that many of us have made a mistake in our thinking. In our zeal to improve or refashion certain current practices in the "education mainstream," they suggest, we have accepted certain postulates from that world which are not only open to question in themselves, but which turn out to be the bases of the very practices we choose to question and to change. We see hints of our mistake in Dudley's plea for humanizing our guidance systems and in Prediger's warning that we must "strive to make a place for the irrationality of human goals, values, and emotion." But we begin to see the character of our mistake best when we express their remarks in the form of certain questions which seem to underlie their advice to us. I will comment on just two such questions.

Question 1: Why do we continue to make "job" the major concern of career education?

All the Career Education Models described and just about all the conversations held during this meeting have in common the commitment that career education should be comprehensive, geared toward student awareness, concerned with individual development of self, coupled with decision making, and based on the acceptance of "career" as preparation for life. In the face of such ideas it must seem strange that someone would accuse us of continuing to make "job" our central concern. But a closer look at the various proposals reveals the troubling fact that the force of our concern remains coventional and, to that extent, we run the risk of undoing the revolution we mean to start. Surely we mean to remove "job" as the central focus of career education, but our approach is indirect at best: we integrate "job" into broader notions about career, into complex program structures, and into a more comprehensive set of goals to which we strive. The result is that there appear everywhere in our proposals concerns for employability, placement, job skills, world of work, and

**Allan B. Ellis is President of Educational Research Corporation, 55 Chapel Street, Newton, Massachusetts 02160.*

occupational specialization. Thus whatever we say about our intentions it is not absolutely clear that we have changed our definitions, strategies, and goals. Diluted them with good intentions, perhaps, but can we be confident that our new mixture will work against the inertia of current popular belief that "career" and "job" are synonomous mechanisms for self-fulfillment?

Question 2: Why do we insist that people be objective about themselves and about the world?

Everyone admits that there is more to life than the objective assessment of data and yet we seem to give scant living space in our models to the alternatives. When we assert that "rational behavior is a necessary but not sufficient component of career choice," we seem to be allowing that all is not rational and yet the effect is to close the issue of whether or not objectivity should dominate the career decision-making process. Perhaps the non-rational, coupled from time to time with the irrational, should dominate the decision process--to be sure, as a necessary but not sufficient component--with reason being used as seasoning. Perhaps. The point, of course, is that by entertaining such a possibility we begin to reassess the relationship between the logical and the psychological and, by implication, the relative contribution to career--working out of self--of reason and of sanity. The fact that we have learned that reason and sanity can be present or absent independent of each other should be a warning that we must be concerned directly with both, even if we end up rejecting Prediger's suggestion to place the use of reason second on our list of concerns for career education.

There are, of course, many other such questions we must ask ourselves, and I think our answers need to be constructed not so much in terms of our models as in terms of the premises, obvious or hidden, which will form the bases of our models. Otherwise we will squander the opportunity we have with our model building to start at the beginning of things, and thereby risk legitimizing the conventional wisdom however much we may alter conventional practice.

Implementation Problems

INTRODUCTION

*Roger Myers**

The next three papers consider the problem of cultural lag in making career education an accepted part of the school curriculum. Innovation progresses more slowly in education than in some other fields, and the mere existence of an efficient and useful system is not enough to guarantee its adoption or retention. Many guidance counselors tend to think of themselves as deans of boys or deans of girls, and are more interested in helping students choose a college than explore the opportunities offered by institutes of technical training. Scientific guidance systems may appear as a threat to such counselors in the same way that programmed instruction appeared as a threat to the ordinary teacher ten years ago.

As in many other situations, the remedy for fear is knowledge. Careful training and indoctrination can help counselors see the usefulness of the new methods. And once a good system is understood and properly used, it builds up its own momentum. But to ensure that it is properly used often requires a period of training. Another problem is that of acceptance of the computer. We move slowly into the machine age; we are not yet at one with the computer as a man is at one with his car. Only actual experience of its usefulness--and realization of the amount of detailed, laborious work it can save us--will lead some of us to regard it as a friendly servant rather than as a waiting enemy.

We need, too, to change the image of career guidance from one of mere job-matching to that of a system of life development, of maximizing the potential for happiness, of helping the individual to "achieve his entelechy," as Aristotle put it--to be all that he was meant to be instead of a stunted thing dominated by his environment. We believe that in the end counselors will find their occupational self-concept enhanced rather than diminished by the new guidance systems. But we cannot expect such a change to occur immediately or of itself. And when the counselor is converted, there is still the taxpayer, the faculty member, and the student, who now has aspirations unrelated to achievement.

The next papers throw light upon these problems of consumer acceptance.

---

*Roger Myers is a Professor of Psychology at Teachers College, Columbia University.

COUNSELOR AND VOCATIONAL EDUCATOR ACCEPTANCE OF SYSTEMS

*Al Mallory**

As part of the operation for implementing the Educational and Career Exploration System (ECES), approximately 80 high school guidance counselors were engaged in a comprehensive inservice training program. The counselor training centered on use and understanding of the computer equipment (terminals and data received from the terminals) and development of increased counseling skills brought about by human relations training. This latter training consisted of increasing communication skills by focusing upon development of listening skills, empathic understanding, and action orientation.

Counselor Satisfaction

A survey of 125 high school counselors in the Genesee Intermediate School District was conducted prior to implementation of the system. A follow-up survey was conducted by Teachers College Columbia University to determine if there had been a change in counselor attitudes. Following are a few statements excerpted from summary reports of counselor involvement in the project.

> "I have found my involvement in this project to be one of the most exciting and rewarding experiences in 20 years of educational work. My first contact with this project came in the fall of 1969 when Al Mallory called a group of counselors to a meeting. As he explained the idea he had relative to a computer-based guidance system, it seemed much like a 'pie-in-the-sky' idea. But as he talked, it became obvious that he was sincerely excited in the possibility of such a program. At each meeting during the year we could see the project coming closer to a reality."

**Al Mallory is Director of Vocational Education at the Genesee Intermediate School District, Flint, Michigan.*

"I first became aware of the computer-assisted guidance and career exploration system through my involvement with operation 'Guiding Light' in 1969. At that time I had no idea I could get so excited over this program nor did I realize the tremendous impact it would have on the students selected for the pilot operation. The reaction of the students and their parents has been most gratifying. A large portion of my day has been spent trying to answer questions of concerned students and parents. Their enthusiasm for this program has been most encouraging."

"In summary, the ECES--Human Relations training I received this year has given me not only tools to work with in counseling, but has given me a yardstick by which I can measure my success or failure."

Human Relations Training

Dr. Robert Carkhuff of Eastern Psychological, Educational and Community Services, Inc. conducted a comparative study to determine effectiveness of counselors who were part of the computer-assisted guidance training and the counselors who were not. His preliminary results indicated that counselors who were involved with the system's training and had some further human relations training were more effective in their interpersonal skills than those who were not involved.

Summary

The impression is that ECES is a significant innovation. Counselors and students alike are highly enthusiastic about the ECES program and the evidence compiled thus far indicates that all those involved believe the system is achieving the desired objective--that of preparing the student to make individually appropriate educational and occupational choices.

TRAINING COUNSELOR AND VOCATIONAL EDUCATOR USERS

*JoAnn Harris**

Since this Conference has focused upon the implementation of technology, more specifically systems approach, in education in the broad sense, I shall confine my remarks to problems of implementing the developing career education models rather than specifically to problems of implementing computer-based systems. As I have participated in this Conference, I am impressed by the scope and quality of engineering which has been done and will be done on the proposed career education models. However, as a director of guidance I see problems in the path toward implementation of the school-based model which must be faced and overcome.

The first challenge is that of changing the concept of what we are trying to accomplish with students from "vocational" guidance to "career" guidance. Since Frank Parsons, the first has had the connotation of helping a not-so-bright kid select a "manual training" course in the curriculum and get his first job. Most counselors react negatively to that kind of assignment. The term "career," as we use it today, connotes assisting the student to develop an adequate self-concept and a broad awareness of the environment in which he moves. The construct of career development suggests a continuous, developmental, interactive process by which self and world communicate, personal meaning systems are formed, and informed choices are made through exercise of decision-making skills. Career thus involves the meaningful series of occupations, the education which leads to the occupations, the personal decision-making systems which lead to the choice points along the way, and the resultant life style of the individual. If a concept of this magnitude can be communicated to counselors, career guidance may enjoy acceptance.

The models which are being proposed, and indeed the whole systems approach now so popular in education, flow from the scientific method. The process proposed and the outcomes desired are highly rational and cognitive. My experience with

---

**JoAnn Harris is both Director of Guidance and Director of Project CVIS at Willowbrook High School, Villa Park, Illinois.*

my colleagues tells me that they consider themselves men and women of art, not science. Their domain is affective, not cognitive; their techniques are intuitive, not systematized; their modus operandi is individual, not group; their outcomes are unmeasurable, not behavioral. For the most part, both their training and their personalities reinforce these perceptions of their role. Their knowledge of occupations is extremely limited both because of limited personal experience and little or poor course work in this area. In order to accept and participate in the systematic process of the career development models, counselors will need retraining, reorientation, and repersuasion. Their peculiar role, as well as that of curricular materials, audiovisual aids, computers, field trips, work experience, etc., must be found and maximized.

The third challenge to implementation of career development models, highly related to the second, is that of influencing counselors to view career guidance as a preventive type of activity as opposed to a curative type of activity. The press of the typical public school guidance environment is such that counselors are spending a huge proportion of their time attending to crises of the moment, some of which are single choice point decisions about what job to take after high school or which educational path to pursue. The career guidance models would attempt to provide the student with sufficient awareness of need for decisions, information about alternatives, and decision-making skill to prepare for any sudden crisis decisions or choices in regard to career plans. Being able to shift a guidance program to this more desirable type of activity implies that the world of crises must stop long enough so that counselors can get off, get reoriented, retrained, and restarted in different activities. Accomplishing this is sure to mean reordering of priorities within guidance departments.

A last challenge to implementation of career education models in schools may be presented by other segments of the school--the faculty and the students. The various subject matter specialties are already fighting for increased time and importance in the student's learning experience. Teachers are highly individualistic and protective about what goes on in their classrooms, and not highly receptive to material recommended from above or outside. The proposed classroom curricular materials of the career education models may be difficult to sell to teachers. Then there are the students. We buy the hypothesis that

good information and decision-making skills will result in "good" decisions and planful, purposeful lives as measured by our value system. I see students of secondary level and above, at least, rebelling against purposefulness, rational decision-making, achievement orientation, and goal-making. So, the students may not buy our best-laid plans for them.

In my opinion, the school-based career education models represent a new era for guidance. They are being well constructed and are incorporating the extent of what we now know from career development theory. The concepts and skills they desire to transmit to young people are badly needed and have too long been overlooked. The hurdles in the way of implementation of these models in real-life schools are high and heavy to move. Expertly-devised programs of training and persuasion for counselors and directors of guidance programs will be mandatory.

MANAGING AND ADMINISTERING THE NEW SYSTEM

*Tommy L. Roberts**

There is no particular system or set of guidelines that can guarantee without question the kind of career development today's school children so rightly deserve. Conventional systems are slow and clumsy, automated systems are extremely expensive, and both types depend upon the dedication of school personnel for appropriate utilization.

New systems are constantly being developed in an effort to improve career education. Some are automated, others are manual. Some are very complex while others could best be described as "Mickey Mouse Systems." Regardless of type or level of sophistication there are always problems to be resolved relevant to successful management and administration. Among these are (1) public acceptance, (2) operational efficiency, (3) system maintenance, (4) personnel mobility, (5) environmental change, and (6) cost.

It is rather obvious that the new manual systems are much easier to manage and administer. They are usually less complex and easier to communicate to the public, thus winning acceptance. They are, furthermore, much easier to maintain in a state of operational efficiency. They require fewer trained personnel, take less effort to modify, and are no doubt cheaper. In fact, there are those who would argue that manual systems are more effective and of greater value than automated systems. However, these adversaries of automation generally have little understanding or appreciation of modern technology.

Even though guarantees for quality career education can never be made, it is now possible to provide teachers and counselors with automated support which frees sufficient time for them to do a better job. Without this time, it is obvious that top quality career eudcation will never become a reality.

Educators can continue to be convinced that all that need be done is to

---

**Tommy L. Roberts is a Psychologist at the Veterans' Administration Hospital, Waco, Texas.*

reshuffle last year's cards. We can take what has always been and categorize it into three new paradigms of consideration only to relegate it to another so-called cesspool of antiquity next year when additional funds become available. They can continue to spend money in select allotments here and there on projects that treat symptoms rather than causes. However, the American educational enterprise will not rid itself of the terrible disease "too much to do in too little time" until its leaders recognize that data massage, movement, and management are the basic causal factors underlying most of today's educational problems. Career education is no exception. In answering this challenge the Computer is King.

The "School Model," much to the detriment of the "Home Model," has been overdeveloped in America. Everything from how to raise healthy flowers to sex and drug education has been taken over by the schools. Many leaders contend that parents are not equipped to handle responsibilities of this type and therefore it is rightly the duty of the school. This is utter nonsense. In fact, it is only a rationalization for not placing sufficient attention on the "Home Model," and developing ways to help parents meet their responsibilities to youth. Today's educators assume that teachers are trained to teach, counselors are trained to counsel, and administrators are trained to establish and implement policy. To be well trained to function as professionals and then be prostituted by a deluge of routine responsibilities that should be met by parents in the home suggests that change is not only needed, but demanded of learned men.

If we accept today's education at the current face value as being the best we can possibly provide our children, then new systems have nothing to offer contemporary education. If by chance, however, new systems hold the key to ridding education of a great plague, then the issue of cost holds no grounds for consideration. It makes little difference whether it is a new model, system, or application if it is never used. To use a new system costs money and if the value is not realized by the public you might as well be spending your time talking to the winds.

In summary, let me point out that this year's models will be next year's discards unless the value system is changed and the hearts of men are made to find new foundations. New systems are easily managed technologically. Even the problems of maintenance can be solved and modifications realized to meet the demands of a changing environment, but to convince the public to spend its money is the greatest challenge of all. In the face of this challenge the Computer holds no sway and last year's model becomes this year's bargain.

INTEGRATION

*Roger A. Myers**

Since it has always been planned by reasonable men and women, the Invitational Conference on Systems Under Construction in Career Education and Development has always included time for concern about the problems of implementing the systems. Such concerns, as I remember them, have been treated with imagination by system developers who were able to predict the implementation problems by extrapolating from what they learned as they tinkered and tried. Now, for the Eighth Conference, we are privileged to have heard from some colleagues who have gone beyond tinkering and trial to the arena where hard, cold decisions about the innovations we promote are made. Each of the speakers on this panel has carried a system beyond the field trial to the real world of the schools and has fought the philosophical, political and economic battles that most of us have been grateful for being able to postpone.

With the limited time available to them, Mallory, Harris and Roberts have focused on some useful issues. Mallory's report of counselor reaction to ECES (the Educational and Career Exploration System) reveals two important insights: (1) an attempt to add to a counselor's resources by providing him with a computer-based system must include careful attention to his human resources and his professional self-concept; (2) when that careful attention is provided, counselor acceptance of the innovation - even a rather intrusive one - will result. Harris' experiences, as successful as we know them to be, seem to have stirred in her some doubts of major proportions. Lest we be lulled to thinking that educational change is easy, she reminds us that some deeply-held beliefs and some carefully guarded assumptions need to be challenged and changed before we can afford much optimism about the future of Career Education. Roberts shares Harris' concern about the danger that we might underestimate the difficulties of implementing systems and models. The problem at the base, he suggests, is the value structure of the public which supports the schools. Acceptance

---

**Roger A. Myers is a Professor of Psychology at Teachers College, Columbia University.*

of a new way of approaching Career Education and support for the automated systems that help to make a new way possible will be consequences - not antecedents - of a change in public values.

One can safely predict that the topic Problems of Implementation will find its way onto the agenda for the Ninth Invitational Conference, and the Tenth. During that time, if Mallory's, Harris', and Roberts' reports can be trusted, we may nail the lid on the worrisome box that contains our fears about whether counselors will use the new systems and whether guidance programs can be modified to make educationally sound uses of the new tools that are being provided. It does not seem likely, however, that we will be enjoying much comfort about the more profound issues of adoption and use in the near future.

It is, of course, no news to anyone that the path of educational innovation is a long and difficult one. But more than any previous one, this Conference emphasized the magnitude of the challenge. Before, we concerned ourselves mostly with the individual systems under construction. These last few days have clarified the not-so-obvious fact that such systems are just parts of a potential change in educational practice - within and beyond the schools - so important and so radical that those who believe in it had better be prepared for a contest of ideas that will dwarf our previous struggles.

I am reminded of a prophetic statement which W. W. Cooley made at the Third Invitational Conference. He said something like, "Inevitably, one man's system is another man's subsystem." And so it has become. "Problems of Implementation" is a bigger topic than it once was.

AFTERWORD

In going over the papers in this Conference, we have noticed certain recurring themes and certain apparent omissions of problems that might usefully be considered. We mention them in the hope that, at our next Conference, you can give us your thoughts regarding them.

One thing we have noticed is that while all of us believe that career includes life as well as work, few of us have done anything about it in our programs. One of you has a system for acquainting the youngster with peer group customs and opinions, but in general we have kept disturbingly close to the old vocational guidance idea. Yet there is much to be learned about how to prepare for the good life, and about the ways in which things ordinarily regarded as recreational play a part in working life. The intersection between the recreational and the occupational circles is sometimes a significant area. For example, if bridge bores you, can you skip learning it or had you better learn it anyway? Are the California high schools wrong in demanding that every child learn to swim, or are there times when inability to swim will be embarrassing as well as dangerous?

Another thing that has struck us is a great similarity among most of the projects. We measure the child's traits and abilities, we make him acquainted with the various jobs and job families, then we try to bring about a match between the individual and one or two of the occupations or occupational fields. These seem to be constant factors that must be present, as flour and liquid are constant factors in the making of bread. The difference between the projects seems to lie in the way in which these constant factors are dealt with. Here and there we find a minor point of intriguing newness, such as the Keysort device that takes the place of a nonavailable computer.

But if the basic factors of career choice programs are fixed by necessity, there are certain questions of application to which we might give additional thought.

One is the fact that, while thought must be given to career choice at the beginning of the high school years, this may be a psychologically unfortunate time for the child to face his own realities. The beginning of high school is often the beginning of adolescence; a time of strain and readjustment, when many of the privileges of childhood are being given up. Great effort is made in our elementary schools to keep the slow child from

knowing that he is slow, the average child from knowing that he is ordinary, and the gifted from knowing he is gifted. Governmental projects have been run on the best ways of creating "induced self-esteem." Students have been assured that they are upward bound. Then we come along, take these slower children out of the warm nursery-nest of elementary school, and tell them that the more attractive walks of life are not for them. What are we doing to them? And if it is something that has to be done, are we doing it at the least damaging time? What's the right age for castrating a kitten?

For what we are doing here is removing the dream--the dream of infinite possibilities that was once the right of adolescence. And we don't yet know whether adolescent daydreaming may not be necessary to the full growth of the personality, as the dreams of our sleep now seem to be necessary for the health and well-being of the mind. We are on new ground here. Children and adolescents of the past often knew that they were locked into their parents' social caste, but there is a difference between social repression that comes from outside and social repression that comes from one's own lack of the qualities required. Is there danger that we may be giving the dull child, or the average child with high aspirations, the bitterness of the cripple?

As we have said, the realization of one's own mental measurements must come sooner or later, if the adult is not to be forever discontented. In traditional America it came slowly, as the child realized that he had more difficulty in learning than the brightest of his class. It usually became final after he dropped out of school, or in the summer after graduation when he went to work in his father's shop and the banker's daughter went away to college. But in past times there was always the economic explanation to fall back on, and people are less ashamed of being poor than of being dull.

It may be that the easiest realization of all would come from facing facts from the beginning, so that the child of limited or average ability would know his mental limits, and their social implications, just as he knows the color of his hair and his ability to compete in physical games. But this is against our whole philosophy and practice, and, in fact, we don't know, when the child is young, what he is going to be. He may be a late bloomer, or have hidden gifts that we are too stupid to recognize. For practical purposes, we as educators are left to bring this realization to him in the high-school years.

Another factor, akin to the problem of self-realization, is that of the effect of early career choice on the child's social standing. Throughout his childhood we have regarded his intelligence level--if we have been permitted to measure it at all--as top secret. It has not even been divulged to his parents except in the most general terms. We know too well the tendency of parents to compare their offspring with those of other parents, to boast of a real or imagined superiority of their own child. But even the mother who said that her child had a perfect intelligence quotient--one hundred--would know what it meant when her son was helped to choose the work of typewriter repairman when her neighbor's son was being encouraged in his dream of becoming an astronomer. In arranging early choice of career fields--and an informed choice, based on tests or records, backed with the authority of a counselor or a computer--we have blown the child's cover.

We can think of only fragmentary solutions for this problem; we hope you can think of better ones. The true solution, of course, would be for us all to forget our occupational snobbery and realize that one useful occupation is as honorable as another useful occupation. And yet--how many blue-collar families do you know socially, excepting those to whom you are related by blood or by marriage? Our social lines of demarcation are drawn along occupational lines, the more so now that agriculture, an inclusive occupational bloc which once took in people of all classes from the cowherd to the country gentleman, is no longer a part of most communities. If we ourselves believe that psychologists and salesman are different kinds of people, we can hardly expect any more liberal attitude from society in general.

One possible solution may lie in the dual choice of career goals recommended by two of the TALENT-generated counseling systems, PLAN and the Comprehensive Career Guidance System. This is nothing new; it was a requirement for rabbis at the time of the writing of the Talmud. A man training to be a rabbi also trained to be a miller, or a weaver, or a tentmaker, for only by having a secondary occupation to fall back on could he have the freedom of conscience to hold out for what he believed against the pressure of his congregation. We have heard that a similar custom now prevails among young priests of the Netherlands. Some hard-pressed principals might see certain advantages in it. And in a time when any occupation may suddenly become obsolete, there is an advantage to the worker in having had some training or preparation for a secondary occupation.

In PLAN, there is a youth-and-parents-generated goal and a data-generated goal--the latter taking into account test measurements, academic records, known job requirements, etc. The student's study plan is arranged to accommodate modules bearing on each career choice. The Comprehensive Career Guidance System attains something of the same result by having a long-range goal and a backup goal, the latter corresponding to the data-generated goal of Project PLAN. In this way the youngster's desires and ambitions are taken into account, even if the counselor or the computer should regard them as unrealistic. The dream is allowed to continue, while provision is made for the time when it may have to be discarded. (One advantage of this is that the youngster may find out that he doesn't want to be an astronomer or an oceanographer anyway; astronomy has too much math in it and oceanographers often have to work in places that smell like a fish cannery.)

Another possible solution, which we think might work for places like Los Angeles which are considering requiring the possession of a salable skill by every high school graduate, would be to arrange a new system of job hierarchies in which the requirements for an entry-level job would also be requirements, or at least desirable skills, for jobs at a higher level in the same field. Let us give an example. Many girls, when they are in high school, want to be doctors. Few of them ever get to the point of applying for admission to a medical school. Our tests can discriminate fairly well between the girl who, if her purpose holds, may actually become a doctor and the girl who would do well to become a medical technician. But it may not be best to make this discrimination overtly. Suppose that instead of putting one girl into the career field for the biological sciences, which includes doctors, and the other into the career field for technicians, we put them both into a single career field--Medical. Both girls would be expected, by graduation, to have acquired the skills of a medical technician. The girl who might actually become a doctor may never have to make a living with these skills, but she will find them useful in her medical courses and knowledge about them will be useful in her practice. While she is acquiring them she is also doing other work that will prepare her for being a physician. (The necessity for this can be suggested to her privately by the counselor.) In fact, the two girls will take different numbers of scientific courses by necessity--the one with ability at the technician's level simply will not be able to, or have the time to, take as many science courses as the other girl. In short, we get both the youngsters on the road

to a realistic goal, and let time and experience teach them that what is an intermediate goal for one will probably be a permanent goal for the other. Such postponements of final goal decision, that nevertheless allow for immediate choice of direction, will be made easier by the creation of jobs of intermediate status such as the paramedical positions now being recommended as a solution to America's problem of providing enough medical care with too few doctors. The student who wants to be a doctor, but may not have the ability, may safely start on the road, for there will be way-stations where he can settle permanently instead of having to turn back.

Some of you may have better solutions in mind, or you may only have noted the difficulties that go with the very necessary choice of career fields. But we hope you will be thinking about this and share your findings with us at the next meeting.

One or two other topics have also occurred to us. First, is there any possibility of extending the guidance service of a computer-equipped school to nearby schools, perhaps on a workshop basis? For example, the guidance counselors of a neighboring school might come to study the system for a few days, then later bring consignments of their students to make use of the computer. A similar question is the feasibility of extending the facilities for career choice to young persons in the community who are not presently part of the school, such as former dropouts or young women currently busy with the care of their children who intend to return to work later.

Another possibility that might increase the ultimate usefulness of the work being done lies in the possible adaptation of computer-dependent systems for use by schools without any computer facilities. Perhaps much, though not all, of a computer-dependent system could be salvaged if simple clerical devices could be made to take the place of the computer in schools with poor financial resources. If you have a very good system that requires a computer, it might still be a good system, though not quite as good, if you wrote the computer out of it. This would also facilitate the extension of your system to poorer countries and other social applications. It does of course ignore the new gains which the computer itself adds by permitting the person to make a large informing system prosthetic to his mind. However, some informing appears better than none.

When computers are used to do what counselors have done, their material can be separated from them as suggested. However, when we really begin to use computers to do in counseling that which they can do and counselors can't do, then this separation will be impossible.

Also we wonder whether we are doing as much as we might in getting feedback from the people who have been through our career guidance systems. Are there things we have overlooked and should have taken into account? Inviting our career choice graduates back for seminars (separate seminars for each field) at which they could discuss their career choice with others who are considering making the same choice, might give us valuable information regarding the true nature and requirements of career fields as well as enabling us to adapt our data to local and current conditions. We wonder, too, whether we may be getting too much of our data from people who made a good choice of a career field, liked it, and stayed in it. Equally useful data might be gotten from the same career field's dropouts and failures. Let's find out just what it is that throws people. We may have thought too much in terms of abilities and not enough in terms of disabilities.

Then, too, we should be interested in knowing what progress any of you have made in altering abilities and disabilities. It might be that techniques could be worked out for this. For example, some jobs require leadership, and we look to see whether the youngster has been elected to class office, whether he suggests projects for the group to carry out, and whether he is a leader in recreation. But most modern jobs require the exercise of assigned, not emergent, leadership. Suppose we try giving the kids practice in assigned leadership, taking turns being head of work gangs, study groups, etc., with the understanding that the leader of the group is responsible for its performance. Under the system of voluntary leadership, many of those who later will have to act as leaders get very little experience in this function. (A fringe benefit of giving everyone practice in assigned leadership will be that many people who thought they wanted to be leaders will find that they thoroughly dislike it.)

Another job requirement for which we give very little training is the capacity for long, sustained, boring effort. Our short school days, broken into a variety of activities, give the youngster little idea of how long a working day can be. Opportunities for testing oneself in sustained effort might lead to many changes in career choice. Would they, perhaps, lead to too many?

One other way in which we might help the student prepare for the working world is to teach him not only the value but the necessity of accuracy. Someone

has commented that being right nine times out of ten will get you a good grade in high school or college, but in the outside world it will get you fired. We should have a few activities, now and then, in which the pass level is perfection.

And, finally, we wonder if the main purpose of the present Conference has been realized, namely the passage of the baton of initiative from those of us in the technology of career development to those of you in career education. We were heartened by the attendance of so many in the forefront of the Career Education Models on the first morning of the Conference. We were discouraged by the absence of so many in the forefront of the Career Education Models from the reports and discussion on the technology of career development. Looking at what people do, not what they say, this absence argues poorly for the introduction into the new practice of career education of yesterday's new ideas which were supported because of their presumed availability for that later new practice. The signs are that a lot of re-inventing of the wheel is in store for the practice of career education. Some adaptation of general and otherwise oriented materials is always in order. But those in career education owe us, their predecessors in the technology of career development, indication that worthy ideas are not being overlooked. The proof of whether that has happened or not will rest in whether the new breed in career education let us in the technology of career development know that we are together in this relay race, taking us into their meetings as they assume leadership and placing us in the condition of being helpful to them, or not.

These are a few of the subjects that we hope you will be thinking about. We may not find the answers, but at least we can be looking for them.

Mary B. Willis
David V. Tiedeman

Palo Alto, California
15 July 1972

APPENDICES

Appendix A: Glossary of Key Concepts in Project PLAN

Appendix B: Guidance and Career Education Modules in PLAN

Appendix C: Science and Social Studies Curriculum Planning Charts

Appendix D: Sample Modules

Appendix E: Sample TLU's and Module Tests

Appendix F: Sample Programs of Study

222 / 223

APPENDIX A

GLOSSARY OF KEY CONCEPTS IN PROJECT PLAN

DEVELOPED ABILITY PERFORMANCE TESTS (DAP): The Developed Ability Performance tests are tests which are intended to measure the "developed ability to perform" components of academic performance (as contrasted with the more readily influenced "achievement" components). The Project PLAN Developed Ability Performance tests are intended to measure many of the same types of aptitude and ability that are measured by the Project TALENT aptitude and ability tests. Examples of developed ability tests include reading comprehension, arithmetic reasoning, abstract reasoning, sentence structure, visualization in three dimensions, and mechanical reasoning.

INDIVIDUALIZED INSTRUCTION: Individualized instruction is a system for allowing and assisting a student to achieve those instructional objectives defined by his program of study. The teacher and student share the responsiblity for selecting the instructional procedures which are likely to be most effective in eliminating the gap between current and desired student performance.

Each student is encouraged to achieve the objectives of his program of study at as fast a rate as possible. The teacher and the computer provide information to the student so that he can assess his own progress so that he can better organize his own time and activities.

INDIVIDUALIZED SCHEDULE: A schedule for completion of modules in the student's program of studies. The computer recommends a schedule for the student based on the student's test scores and past performance in PLAN. Different students need different amounts of feedback from teacher, parents, and peers built into their schedules so that they can maintain their learning progress. The advantage of an individualized schedule is that it provides each student with an expectancy of the pace of his learning so that he can learn to schedule his time efficiently within the instructional program.

INSTRUCTIONAL GUIDE: An instructional guide is printed instructional material developed by the Project PLAN staff to accompany a TLU when commercially available instructional materials are either inadequate or inappropriate for the achievement of a specific instructional objective.

INSTRUCTIONAL MATERIAL: Instructional material is any book, workbook, film, etc. that may be used by the student in the systematic achievement of an instructional objective.

INSTRUCTIONAL OBJECTIVE: An instructional objective is a goal intended to be measurably achieved as a result of instruction. Properly stated, an instructional objective describes the behavior of the student which is intended to be developed or strengthened, the important conditions under which the behavior is to occur, and the criterion of acceptable performance. The instructional objective should be written in a language which the student can understand. The instructional objectives of a module are printed in each TLU at the intermediate and secondary levels and in the teacher's supplements at the primary levels.

MODULE: A module is a set of instructional objectives which are intended to be achieved by the average student in approximately two weeks. The main vehicle for the teaching of the instructional objectives of a module is the TLU. Each TLU of the module is designed to use different instructional activities to teach the objectives of the module.

MODULE TEST: A module test is a test given to the student when he completes a TLU. The purpose of a module test is to determine whether or not the student has achieved the objectives of a module.

Every item on the module test refers to a specific instructional objective. Two major types of items may be included in the module tests: (1) items which measure the achievement of objectives of that module, and (2) items which are intended to measure long-range objectives such as reading comprehension, vocabulary, writing ability, etc.

The module test is designed so that most of the items for each objective should be answered correctly by the student if he has completed the module (the "success principle"). The teacher and the student should confer jointly to decide if the student is ready to challenge the module test. Each module test is scored by the computer and the teacher and student are informed of the student's performance level in achieving each of the instructional objectives of the module. The computer also recommends to the student the instructional objectives which require further study or review.

Each module test can receive one of four overall scores: Complete, Student Review, Teacher Certify, or Not Passed. This overall score is a function of how well the student has achieved each of the objectives of the module. Scores are also reported on each objective of the module. In this way the teacher and the student know immediately those instructional objectives on which the student needs to improve his achievement. Since the steps in the TLU's are cross-referenced by the code number of the objectives, the teacher can easily assign parts of the TLU to be studied by the student if his module test results indicate that further study of an instructional objective is desirable.

NON-GRADED CURRICULUM: A non-graded curriculum is a curricular structure through which a student proceeds on the basis of his performance and ability rather than on the basis of either his chronological age or on the basis of the number of hours he has spent in school.

Project PLAN is a non-graded program of individualized instruction which focuses on the achievement level, the interests, and the abilities of the student.

PLAN: PLAN stands for a "Program for Learning in Accordance with Needs."

Project PLAN is a computer-supported individualized education system which is designed to incorporate the best judgments of subject-matter, specialists, educational psychologists, teachers, students and administrators to develop suitable educational programs within the limits of a practical instructional technology.

PROGRAM OF STUDIES (POS): A program of studies is a tentative selection of the sequential and non-sequential modules in a subject area for a student.

Each student's suggested program of studies is generated by a computer. This tentative program is amended by the computer through the use of the student's long-range goals, interests, academic record, standardized achievement test scores, past performance in Project PLAN, and performance on PLAN module tests.

TEACHING-LEARNING UNIT: A teaching-learning unit (TLU) is an instructional unit designed to assist students to achieve the instructional objectives of a module by using existing commercial instructional materials.

TLU's differ in mode of presentation of information, amount of practice, amount of review, pacing, level of reading difficulty, etc.

A TLU consists of a set of printed directions which inform the student of the instructional objectives of the module, the instructional materials he is to use and what he is to do with them, and the examples of the objective which tell him how he will know when he has achieved the instructional objectives of the module.

There are two major types of TLU's in Project PLAN: (1) "materials-specific" and (2) "materials-general." The materials-specific TLU contains references to specific instructional materials which are recommended to the student for the attainment of the instructional objectives of the module. The materials-general TLU does not recommend any specific instructional materials for the module, but instead allows the teacher to assign this type of TLU to a student as part of a research project intended to assist the student to discover materials which are relevant to the attainment of the instructional objectives of the module. The materials-general TLU contains a "key-words" column which contains suggested learning activities and gives hints to the student so that he can locate relevant content within the available instructional materials.

APPENDIX B

GUIDANCE AND CAREER EDUCATION MODULES IN PLAN

Career and Vocational Information Modules

40-058 Consumers and Producers
40-059 Wishing and Choosing
40-060 Neighborhood Helpers
40-061 Transportation
40-102 Small-Town Neighborhoods
40-110 Schools in the Neighborhood
40-113 TV Programs
40-119 People in the Neighborhood
40-151 What is a Community?
40-163 Mountain Communities 1
40-164 Mountain Communities 2
40-167 Grassland Communities 2
40-169 A Planned Community
40-208 Searching for Information
40-211 A Modern View of Your State
49-350 Introduction to the World of Work
49-351 The Variety of Jobs
49-353 Business Sales Occupations
49-354 Mathematical and Physical Science Occupations
49-355 Mechanic and Repairman Occupations
49-356 Health Service Occupations
49-357 Industrial Trades Occupations
49-358 Business Management Occupations 1
49-359 Business Management Occupations 2
49-360 Teaching Occupations
49-361 Public and Commercial Service Occupations 1
49-362 Public and Commercial Service Occupations 2
49-750 Introduction to the World of Work
49-751 The Variety of Jobs
49-752 Preparing for Career Decisions
49-753 Technical Occupations 1
49-754 Technical Occupations 2
49-755 Engineering and Architecture Occupations
49-756 Biological Science Occupations
49-757 Social Service Occupations
49-758 Business-Clerical Occupations 1
49-759 Business-Clerical Occupations 2
49-760 Building Trades Occupations
49-761 Social Science Occupations
49-762 Performing Arts Occupations

Orientation and Study Skills Modules

89-301 PLAN: Orientation
89-302 PLAN Program of Studies
89-701 PLAN Orientation
89-702 PLAN Program of Studies
19-301 Strategies for Test-Taking
19-302 Study Skills
39-301 Individual Differences and Their Measurement
39-701 Individual Differences and Their Measurement
19-701 Strategies for Test-Taking
19-702 Study Skills
19-703 Listening Skills

Student Goal Formulation Modules

89-703 Choices and Consequences
89-704 Introduction to Decision Making
89-705 Job Families and Jobs: Introduction
89-706 Job Families and Jobs: Part I
89-707 Job Families and Jobs: Part II
89-708 Job Families and Jobs: Part III
89-709 Job Families and Jobs: Part IV
89-710 Career Planning Practice I
89-711 Career Planning Practice II
89-712 Interests and Values in Career Decision Planning
89-714 Student-Parent Evaluation of Long Range Goals

Military, College and Post-High School Counseling Modules

19-704 After High School, what?
19-705 Information About Colleges
19-707 Draft and Military Information
19-556 Speech--Job Opportunities
19-708 Application Skills
15-402 Preparing for Leaving High School: Application Skills
85-003 Preparing to Leave High School: Interviewing Skills
85-004 Part-Time Job Application Skills
85-005 Leisure Time Activities I: School Related
85-006 Leisure Time Activities II: Non-School Related
85-007 Citizenship Activities I: Political Involvement
85-008 Citizenship Activities II: Community Involvement
85-009 Citizenship Activities III: Making Your Views Heard

Student Assessment Devices

Kindergarten Reading Readiness Form
Introductory Reading Placement Tests
End 4 Module Tests
PLAN Achievement Survey Tests
Developed Abilities Performance Tests
General Information Test
PLAN Interest Inventory
Student Learning Style Rating Scale
Student Attitude Inventory

APPENDIX C

SCIENCE AND SOCIAL STUDIES

CURRICULUM PLANNING CHARTS

SCIENCE

MAJOR CONTENT DEVELOPMENT	THINGS AND SENSES 1	INTERACTION OF THINGS 2	SYSTEMS & INTERACTION PATTERNS 3	THE RELATIVITY OF THINGS 4
A. LIFE SCIENCE TOPICS Health			*Food ○ (GS); where we get food ○ (GS)*	Human body growth Human body systems Foods & health *Where we get our food & how we use food (GS)*
Biology	Living things: organisms plant characteristics & animal characteristics	Birth: male, female, live birth, & eggs Growth *Linear measurement; graphing (M)*	Patterns in living things Pre-historic animals, fossils Plants & animals interact Animal development Life cycles *Symmetry (M)*	Adaptations Classification of living things *Interrelation of cells (M)*
Ecology	Living things in their environments	Organisms interact with the environment Decay *Spoilage (GS)*	Habitats & communities: forests, etc. Conservation *Resources (GS)* Food chain	Habitats affect the survival of things
Psychology	Learning from the senses, etc. Individual learning differences & *Learning styles (G)*	Laws of learning		Human learning (laws of) Individual differences & psychological testing
B. PHYSICAL SCIENCE TOPICS Physics	Non-living objects	Magnets, electricity Rollers, wheels, gears, & pulleys	Motion & force Patterns in non-living things Simple machines Light & sound Systems	Mass, balance Relativity of position & motion
Chemistry	Properties of things: material composition, weight, temperature, & solid, liquid or gas	Interaction & evidence of interaction	Energy (to do work, cause interaction) Heat Solutions, filtering	Temperature changes - expand & contract
Computer Science	*Linear measure, counting; temperature, & time (M)*	*Measurement (M)* *Linear to 1/2 inch* *Liquid to gallon* *Shadow clock & sundial (M)*	*Measurement; histograms; & estimations (M)* *Time to minute (M)*	*Use of thermometer (M)*
C. EARTH SCIENCE TOPICS Geology	Rocks, air, & water (as examples of solids, liquids, & gases Metals & non-metals	Erosion of soil	Rock cycle Earth materials	Earth changes, volcanoes & earthquakes Classification of rocks: igneous, metamorphic, & sedimentary *Physical features (GS)* Earth layers
Meteorology			Climate & weather Water cycle	
Astronomy	Suns, moons & stars as objects around us		Energy from the Sun	Motion: revolve, rotate Suns, moons, stars Universe - solar system *Space-time lapse (M)*

Earth and Space Science INQUIRY PROCESS DEVELOPMENT*		Soil & plants interact Soil & animals interact	*Effect of natural environment on Man (2D)*	Gravity: affects position & motion
A. OBSERVING/PERCEIVING Properties, situations Measuring, estimating Function of observation Perceiving subtleties, details, relationships, relevance.	Describes properties of objects: size, >, <, = (M) weight temperature (hot, cold) Identifies senses used Gives evidence of identity	Observes before-after situations Uses rulers, magifying glasses with senses Identifies evidence of interaction	Describes interaction using 1) senses only & 2) measurement Skills in seeing patterns of space/time relationships *Measures up to 1/4 inch (M)*	Describes plant & animal adaptations Describes properties of foods Uses English units to *1/8 inch accuracy (M)*
B. QUESTIONING/PROBLEM FORMULATION Basic curiosity Challenges: methods, results, & accuracy Relevance Researchability	Asks about what he reads, sees, or does	Asks about interaction in the environment	Asks questions relevant to his program of studies	Records questions from casual observations Forms questions "unanswered" after experiments
C. [illegible] Grouping-sorting, matches Classifying with or without instructions Inventing new systems of classification	Sorts, groups & classifies objects by property or by material Sets up simple groups of living things	Matches measuring devices with purpose & units Interaction vs. non-interaction situation	Identifies the components of systems Matches organisms to their habitat	Classifies organisms into major phyla & chordate classes Sorts/ classifies objects with up to 3 characteristics
D. FORMULATING HYPOTHESES Simple "guesses" "If-then" statements Research Probability Testing, evaluating, hypotheses		Makes guesses or simple predictions	Makes guesses & simple "if-then" statements	Makes statements which are predictive prior to experimentation *Practice predicting problems & solutions patterns for hypothesis* *Understands "why" "if-then" statements (M)*
E. EXPERIMENTING Basic manipulation Technical skills Controls vs. variables Delimits operationally Designs & evaluates instrumentation	Extensive manipulation of objects Association of object manipulation with information gaining Follows simple instructions Begins to assess the quality of his work	Sets up, follows an instruction, & cleans up Keeps records *Reading a graph (M)*	Plans, sets up, & carries through an experiment Makes charts, tables, simple graphs (bits&pats)	Conducts tests of unknown kinds Uses charts, tables, graphs & drawings Formulates a plan before experimenting
F. INTERPRETING & APPLYING Infers change, interaction Supportive data, research Interprets data Concludes, generalizes Implies in nature & society	Gives evidence to support inference (responds to the question: "how do you know")	States when change has occured - i.e. interaction between things Supports interaction inference with appropriate evidence	Forms general ideas of patterns in nature - i.e. symmetry & cycles *Patterns of events & cycles (M)*	Makes simple inferences & conclusions Forms generalizations about food, nutrition & body growth
G. EVALUATING Technology & society Responsibilities of scientists Welfare of Man History-philosophy of science				

*Student proficiency to be monitored during PLAN I; results define need in PLAN II

SCIENCE

MAJOR CONTENT DEVELOPMENT	THE BEHAVIOR OF THINGS 5	VISIBLE AND INVISIBLE THINGS 6	ANALYSIS OF INTERACTIONS AMONG LIVING THINGS 7	ANALYSIS OF INTERACTIONS AMONG NON-LIVING THINGS 8
A. LIFE SCIENCE TOPICS Health	Exercise behavior & health Management of health	Disease *Health, disease in society (SS)* Health Disease fighters	Health & first aid *Health & anxiety (SS)* Effects from smoking & drinking Human reproduction Human body systems	Technologic contributions to the welfare of man
Biology	Needs of plants & animals Behavior of things due to their needs or requirements	Microscopic things, protozoa, algae, fungi, & cells Cells	Analysis of plants: plant changes, plant diversity Analysis of animals: animal changes & animal diversity	Levers in Man Chemistry of Life
Ecology	Behavior of animals: migration, hibernation, food getting, motivation, competition - territory Behavior of plants: germination - dormancy, coloration, & movement *Behavior of animal societies (SS)* *Migrations of people (SS)*	Introduction to the ecology of microscopic things; food getting, movement, etc.	Interdependence; symbiosis Societies *Animal societies (SS)* Interaction & change of biotic factors in the environment Helpful & harmful organisms	
Psychology	Behavior of Man (management of human learning) Man's reaction to space flight Test & measurement theory		Analysis of Man: varieties of Man, changes in Man, changes in Man as a result of learning, learning how to learn, & systems of Man *Migrations & space (SS)*	Perception (senses) Learning about learning & self-management of learning *Hypothesis testing (M)* Changability of individuals
B. PHYSICAL SCIENCE TOPICS Physics	Magnetism *Compass direction (SS)* Electricity	Forces & motion: acceleration, deceleration, velocity, & inertia Energy: kinetic & potential Wave theory: light & sound Machines: simple & compound		Classes of levers *Graphing (M)* Magnetic fields & domains Light & sound Electronics & microminiturization
Chemistry	Matter, materials, & atoms Solutions, temperature effects Molecules	Elements, mixtures, & compounds	Chemical factors in environments *Geographic factors (SS)*	Introduction to chemistry Kitchen chemistry Heat: radiation, conduction, & convection
Computer Science	Use of metric system *Linear, mass, & temperature, time measurements (M)* *Geometry measure-volume (M)* *Inventions & technology (SS)*	*Problem solving (M)* *Technology (SS)*	*Scientific notation, applications (M)* *Scientific approach to solution (M)* Technology & life science	Introduction to the computer Computer science *Technology (SS)* *Introduction to probability & statistics (M)* *Statistical predictions (M)*
C. EARTH SCIENCE TOPICS Geology	Classification with a scale: (Moh's hardness scale)	Materials of the Earth *Resources (SS)*	Ecosystem & geographical features	
Meteorology	Air as a fluid: atmosphere, weather & maps, & climate *Map symbols (SS)*			Weather satellites
Astronomy	Behavior of suns, moons, & stars			Space communication

Earth and Space Science INQUIRY PROCESS DEVELOPMENT*	Rockets - missiles Space programs *Economic systems (CS)*	Wave phenomena	Life support systems for space travel The Sea as a frontier & laboratory *Continents & oceans*	Application of technology to Space Science *Economics* *Technology & society (SS)*
A. OBSERVING/PERCEIVING Properties, situations Measuring, estimating Function of observation Perceiving subtleties, details, relationships, relevance.	Recognizes observation as a step in the scientific method Makes use of qualitative & quantitative observations Use metric system of measurement	Incorporates observations as a part of experiment reports Produces models of objects or systems of objects (e.g. atoms, molecules, etc.)	Uses observations in the analysis of interaction Observation as a means to document cause & effect in living things	Descriminates between relevant & irrelevant observations Documents cause & effect in physical systems
B. QUESTIONING/PROBLEM EVALUATION Basic curiosity Challenges: methods, results, & accuracy Relevance Researchability	Questions ways of experimenting Does not accept casual observations for substantial evidence	Questions precision & accuracy of observations Pursues questions or problems by designing an experiment	Begins to form specific scientific questions, for experimentation	Forms specific, researchable questions Forms questions about in interactions between technology & Man *Meaning of problem solving (M)*
C. TAXONOMIC/CLASSIFYING Grouping-sorting; matches Classifying with or without instructions Inventing new systems of classification	Classifies according to given scale; invents own classification scheme	Classifies microscopic things (simple) Classifies machines: simple, compound, & classes of levers	Uses classification systems in the analysis of plant & animal diversities	
D. FORMULATING HYPOTHESES Simple "guesses" "If-then" statements Research Probability Testing, evaluating hypotheses	Applies prediction & hypothesis techniques Descriminates between hypotheses & conclusions Identifies good sources (authorization) of information which are available for research from the environment	Delays statements until research is completed Applies: tests & hypotheses *Hypothesizes & predicts for "Talent individuals" (S)* *Possible outcome of an event (M)*	Creates statements which explain cause-effect Creates statements which explain change & interaction	Creates hypotheses when conclusions or inferences are unfounded Hypothesizes following confrontation with discrepant events *Probability concepts (M)*
E. EXPERIMENTING Needs manipulation Isolates variables Holds two variables while manipulating third Designs & evaluates investigations	Constructs graphs with some instruction Recognizes definitions & examples of variables Systematically follows experimental procedures	Develops basic microscope skills Recognizes factors in controlled experiments Records & reviews experiment plans	Experimenting viewed as a step in inquiry Variables/controls considered in experimenting Experimenting viewed as a means to form inferences	Uses variety of scientific equipment: glassware, balance, meters, thermometer, etc. Identifies variables & controls in experiments Self-critiques his experimental methods Makes formal reports
F. INTERPRETING & EXPLAINING Infers change, interaction Supportive data, research Interprets data Inferences, generalizes Examples in outside & industry	Makes inferences & generalizations on the behavior of things	Draws inference on basis of data a) Inferences in human planning (Talent planning game) b) Inferences in natural world Supports inference with additional information about disease causing organisms Generalizes about wave phenomena	Interprets data to explain change & interaction Generalizes about interactions in the ecosystem	Extrapolates & interpolates data from graphs Relates principles to use by technology
G. [illegible] Technology & society Responsibilities of scientist Ethics of the [illegible] Philosophy of science			Applies needs of man to life support systems in space capsules & sea labs	Documents interactions between technology & Man

*Student proficiency to be monitored during PLAN I; results define need in PLAN II

SCIENCE

MAJOR CONTENT DEVELOPMENT	THINGS OF EARTH & THINGS OF SPACE 9	THE ECOLOGY OF THINGS 10	THE CHEMICAL BEHAVIOR OF THINGS 11	PHYSICAL BEHAVIOR OF THINGS 12
A. LIFE SCIENCE TOPICS Health		Disease: study & control Human reproduction	Chemistry contributions to health & disease Medical chemistry	Nuclear energy & health
Biology	Paleontology (S) *(M)* *Early civilization* Fossils in rocks Eras & geologic periods	Biology concepts Plant-animal structure & function Cell physiology Genetics - heredity Evolution *Social Darwinism (SS)*	Biochemistry: ATP, ADP, DNA, RNA, Krebs Cycle, Photosynthesis, & enzymes	Anatomical mechanics Biophysics
Ecology	Oceans & life forms	Ecology concepts: energy flow in abiotic environments; community relationships; ecosystems	Insecticides: development & use in the environment	Radioactivity & living tissue
Psychology	Measurement theory & how to take tests	*Minorities & races (SS)* *Social Darwinism (SS)* *Families & societies (S) (SS)* Innate vs. learned behavior Conditioning Social behavior	Operation of the nervous system Chemistry of learning	The role of learning & experience in the modification of man History of science Philosophy of science
B. PHYSICAL SCIENCE TOPICS Physics	Application of matter & energy concepts -kinetic-potential energy, periodic motion, mass, weight, & density	Radioactivity & carbon dating	Kinetic-molecular theory *Group theory; isomorphism (M)* Nuclear chemistry & applications	Concepts of force & motion Machines & work Magnetism, light, & sound Nuclear physics *Probability (M)* Electricity AC, DC, static
Chemistry	Application of: -atomic-molecular models -elements, mixtures & compounds	Chemistry & life Light & phototropism Matter/energy flow in the Ecosystem Molecular biology topics	Chemistry of solids, liquids, & gases Organic - inorganic Transformation of matter & energy Chemistry in the home	
Computer Science	Measurement *Motion & rotation (M)* Computers & space flight	*Probability (M)* Instrumentation in biology	Equilibrium in chemical systems	Measurement of matter & energy *Vector analysis (M)*
C. EARTH SCIENCE TOPICS Geology	Rocks & minerals; sediments & mountains Seismology; the changing earth Erosion; the land wears away Oceanography; waters in the sea	Environmental conditons in the ecosystem/biome: light, precipitation, heat, & elevation Geotropism	Chemistry of rocks & minerals Earth metals & mining the natural resources	Center of mass, gravity *Analysis (M)*
Meteorology	Meteorology; waters in the Air	Precipitation & biome needs		Man's control of weather
Astronomy	Astronomy; the earth in space	Life on other planets?	Chemistry of planets in the solar system - spectrographic analysis	Falling bodies Projectiles *Trigonometry & calculus (M)* Concepts of anti-matter

Earth and Space Science INQUIRY PROCESS DEVELOPMENT*	Manned space flights & achievements *Conservation ○ (SS)* *Planets-maps; space as a new frontier ○ (SS)*	Gravity affects life Pollution of the environment Space biology-physiology in space	Chemical pollution Contributions chemistry makes to space technology	
A. OBSERVING/PERCEIVING Properties, situations Measuring, estimating Function of observation Perceiving subtleties, details, relationships, relevance.	Perceives subtleties & qualities in various natural situations Separates factual information from non-factual information	Uses skills of observation & perception as needed Perceives the function of observation in scientific procedures	Perceives the importance of observations to one's education	Relates how the "prepared mind" is a prerequisite to a(n) "discovery" or "invention"
B. QUESTIONING/PROBLEM FORMULATION Basic curiosity Challenges methods, results, & accuracy Relevance Researchability	Continues to challenge & question	Questions the significance of variable factors important to equilibrium in ecological systems		
C. TAXONOMIC/CLASSIFYING Grouping-sorting; matches Classifying with or without instructions Inventing new systems of classification		Analyzes bases & purposes of various classification systems Invents an original dichotomous classification system	Descriminates between nomenclature & taxonomy	Locates & uses sophisticated classification systems which are standardized
D. FORMULATING HYPOTHESES Simple "guesses" "If-then" statements Research Probability Testing, evaluating hypotheses	Formulates hypotheses as needed Recognizes hypotheses as models	Traces the history of an idea or theory & identifies the factors which contribute to that development		
E. EXPERIMENTING Basic manipulation Technical skills Controls variables Defining operationally Designs & evaluates Communication	Makes use of scientific notation Continues self-critique methods	Reports data using significant figures Uses multitude of inquiry techniques Redesigns experiments as needed	Experiments as needed Uses sophisticated techniques of experimentation with complex equipment	Continues to design & improve his sophisticated techniques of experimentation
F. INTERPRETING & APPLYING Infers change, interaction Supportive data, research Interprets data Concludes, generalizes Examples in nature & industry	Forms generalizations or major ideas following varied experiences	Infers, applies & generalizes as needed	Uses mathematical models to explain phase changes (deriving formulae from graphs)	Generates a philosophy of science
G. HUMANIZING Technology & society Responsibilities of scientists Welfare of Man History-philosophy of science	Relates significance of discoveries to welfare/attitudes of Man	Poses solutions to problems of pollution, food supply, sanitation, & conservation Evaluates impact/desirability of technological advances in society Analyzes problems & unwise use of technology Relates scientific activity & progress to socio-economic support	Repeat →	Repeat →

*Student proficiency to be monitored during PLAN I; results define needs in PLAN II

SOCIAL STUDIES

TOPICS OF STUDY	THE IMMEDIATE ENVIRONMENT 1	NEIGHBORHOOD STUDIES 2	COMPARATIVE COMMUNITIES 3	REGIONAL STUDIES 4
A. HISTORY Time, chronology, sequence, change Growth of civilizations Historical interpretation	Concept of time *Calendars; time; hour, 1/2 hour (M)*	Elements of a pioneer neighborhood	Changes in communities over time Changes in needs of people *Economic - economic (IA)*	Contributions of immigrants to regional life in America Growth & development of various regions
B. SOCIOLOGY/ANTHROPOLOGY Social relations Structure & function of society Education & socialization Demography Cultural differentiation Primitive societies	My family & friends Other families & friends Roles of family members My school Schools & use of leisure in other parts of the world Different family patterns in America today, & around the world	Social & ethnic groups in the neighborhood Types of neighborhoods - farm, suburban, etc. *Classification (S); acts (M)* Racial vs. cultural differences in man Elements & customs of neighborhoods in other parts of the United States & World Cultural patterns of subgroups in the United States	Community organizations *(Cultural differences (IA)* Comparison of societies *(Cultural differences (IA)* Community types - Mountain, Desert, Tropical Rain Forest, Artic, & Grassland are used as the vehicles of comparison Similarities & differences in communities in different parts of the world	Population distribution & customs of dress within regions of USA States of contrast - Alaska & Hawaii (comparison) Cultural influences of various ethnic groups on regional life Identification of regions in world similar to those in USA
C. PSYCHOLOGY/PHILOSOPHY Emotions Importance of values Cooperation & conflict Interdependence	My identification with others *Sets; intersection (M)* Meaning of friendship & cooperation The child as a member of the family & the school	Dependence of people on others in neighborhood Agencies of Service in the Neighborhood	Interaction of people Interdependence of peoples in community & world *Interaction in natural communities (S)* The effect of religion on community life	Cooperation & interdependence in interstate relations
D. POLITICAL SCIENCE Rules & laws Government - types, services, etc. Obligations & responsibilities Elections, political parties, representatives Political ideologies	Rules at home & school for common good Authority in the school & at home	Rules in the neighborhood Responsibilities of citizens Government in the neighborhood	Laws as essential in communities (the need for government in Human society) Services provided by local governments Need for informed citizens *Clarity of ideas (IA)*	Reasons for organizing states Comparison of different types of state Governments

E. GEOGRAPHY Natural resources & conservation Topographical features Effects of climate, weather, etc. on man Location of places, regions, continents, etc.	The school: physical plant & grounds	Map location of places in neighborhood *Pictographs, bargraphs, & pie charts (M)* *Intersection-corner (M)* Shapes of the earth, land masses, & oceans	Globe; continents & oceans, land forms, directions Use of natural resources *Conservation (S)* Effects of natural environment on man *Climate & weather (S)* Identification of geographical features *Reading & using map scale (M)* *Charts & tables (S)*	Physical feature of regions & states of USA Topography Effects of natural environment on regional life Location of states & regions of USA *Earth changes (S)* *Linear measure (M)* Exploitation of natural resources
F. ECONOMICS Workers & occupations Agriculture, industry, stores Earning, spending, saving Transportation, communication	Workers in school, home & neighborhood *Vocational families (G)* Essential needs of families *Government community service, general labor - skilled labor (G)* Goods & services	Workers, occupations & volunteers Essential needs of people Earning & spending *Money (M)* Types of communication & transportation	Workers in communities *Business, professions, labor, skilled trades (G)* Production & processing Need for exchange - money, goods, services *Money (M)* Uses of communication & transportation *Simple machines (S)*	Major occupations of people within regions of USA Major products & services of regions Conservation of resources within regions

SOCIAL STUDIES

GENERAL SOCIAL SCIENCE TOPICS OF STUDY	AMERICAN STUDIES 5	THE WESTERN HEMISPHERE 6	THE ADOLESCENT & HIS WORLD 7	BIRTH OF THE UNITED STATES 8
A. HISTORY Time, chronology, sequence, change Growth of civilizations Historical interpretation	Simple chronology of American History: basic periods (U.S. & Canada) Analysis of some of the major events in American & Canadian History *Historical fiction (LA)* Motives & causes for the discovery, exploration, & colonization of North America	Simple chronology of Latin American History: basic periods Historical analysis of major themes in the discovery, colonization, & development of Latin America Historical analysis of selected Western Hemisphere nations: Mexico Argentina Brazil	History of the draft, laws, & civil liberties History of the American city	Analysis of important aspects of pre-Twentieth Century American history *American literature (LA)*
B. SOCIOLOGY/ANTHROPOLOGY Social relations Structure & function of society Education & socialization Demography Cultural differentiation Primitive societies	The evolution of American social order Education in the U.S. The use of leisure time in America *Leisure time considerations; educational requirements (G)* Influence of foreign cultures on American life The American Indian (Eastern Forests, Plains, Southwest, Northwest) *Folk tales (LA)* *Migration of animals (S)*	The evolution of society in Latin America Ecology of the Western Hemisphere Basis of the "class" system Similarities of human & non-human societies *Behavior of animals (S)* Health & disease in underdeveloped areas of Western Hemisphere *Health & disease (S)* Influences of European & Indian cultures on Latin American life	Changing concepts of leisure time Teenage relationships & roles - within family & society Societal implications of drugs, cigarettes, alcohol *Harmful effects from smoking & drinking (S)* Problems of the cities Current & recurring social problems Changes in cultures as a constant occurrence through contact with one another Minority group culture	The role of minority groups in the development of the American Social Order The growth of public education Social trends & legislation
C. PSYCHOLOGY/PHILOSOPHY Emotions Importance of values Cooperation & conflict Interdependence	The role of religion in colonization The role of cooperation, competition & conflict in in the development of the U.S. & Canada Interrelationships between U. S. & Canada	Influence of religion on the development of Western society Cooperation & interdependence of Western peoples	Emotional problems Basis for one's emotions & motives *Interpret personality results (G)* Understanding decision making *Logic (M)* Internalizing conflict *Review of personal values (G)*	Democracy, extremism, & moderation as aspects of the American character Need for compromise among men Types & reasons for propaganda *Logic (M); Fact & opinion (LA); Propaganda (LA)*
D. POLITICAL SCIENCE Rules & laws Government - types, services, etc. Obligations & responsibilities Elections, political parties, representatives Political ideologies	Justification for Government Basic principles of the Declaration of Independence & the Constitution Importance of laws in U. S. history & present Standards by which to judge laws	Political review of selected Latin American & North American countries or states Political geography of Latin America	Teenagers & the law, draft, civil liberties Our responsibilities to ourselves & others Job acquisition skills *Interview/business letters (LA)* The city in American politics	Rise of nation states, a federal government & political parties The Constitution: a review -strict vs. loose interpretation -major interpretations & changes Tactics of the election process & 2 party system Separation & division of powers Foreign policy trends

E. GEOGRAPHY Natural resources & conservation Topographical features Effects of climate, weather, etc. on man Location of places, regions, continents, etc.	Effects of environment on discovery, exploration, & colonization *Adaptation* (4) *(S)* Use & preservation of resources yesterday & today Migration Grid, relief, scale, vegetation, precipitation & other special maps	INTENSIVE GLOBAL GEOGRAPHY - graphs, map projections, climate patterns, relationship of earth to other planets, etc. *Weather & climate* (12) *(S); graphs, geometry (M)* Physical & cultural geography of the western hemisphere Location of population & production centers in the western hemisphere	Population vs. geographical factors *Population problems* (10) *(S)* Pollution of the water, air, & land *Pollution* (9) *(S)* The Urban Environment	Sectional differences in USA Environmental aspects of the nation that man faces
F. ECONOMICS Workers & occupations Agriculture, industry, stores Earning, spending, saving Transportation, communication	Earning a living: then & now Influence of inventions & job obsolescence Merits & limitations of technology (business oriented) *Technology & space programs* (6) *(S)* Economic policy as it relates to American History (U.S. & Canada)	Economic review of Latin America, US, & Canada	Economic problems & achievements of the cities The role of advertising in 20th Century Society *Propaganda (LA)*	Industrialization in USA Gold vs silver currency issues Capitalism as basis of US economics The economy & government: need for controls The consumer dollar

SOCIAL STUDIES

GENERAL SOCIAL SCIENCE TOPICS OF STUDY	CULTURES OF THE WORLD I 9	CULTURES OF THE WORLD II 10	20TH CENTURY AMERICAN STUDIES 11	CONTEMPORARY DEVELOPMENT & PROBLEMS 12
A. HISTORY Time, chronology, sequence, change Growth of civilizations Historical interpretation	Purposes & methods of historical analysis *Reliability of statistics (M); Biography & autobiography; criticism; point of view (LA)* Significance of past civilization on present day nations of world *Fossils, paleontology (S)*	Historical analysis of selected areas of the world: 1) Australia 2) Soviet Union 3) China 4) S. E. Asia 5) Western Europe 6) Middle East & N. Africa 7) Sub-Saharan Africa 8) Japan	Importance of past events, people, & trends on the USA in the sixties Historical interpretations of major cause/effect relationships in 20th Century America BLACK HISTORY	Brief historical analysis of selected economic systems & governments (Critical analysis (LA)) Changes as universal & inevitable
B. SOCIOLOGY/ANTHROPOLOGY Social relations Structure & function of society Education & socialization Demography Cultural differentiation Primitive societies	Characteristics of societies & groups in past & present Social Darwinism *Evolution of man; characteristics: individuals & populations (S)* Cultural distinctions between areas of world in past Comparison of Early Civilizations	Family & social structure of various societies of the world Interrelationships of sociology & geography Minorities, immigrants & individuals in societies *Varieties of man (S)* Comparison of cultures in three of the above areas of the world Contributions of primitive societies to world & USA *Paleontology (S)*	Prejudice, ghettos, & other problems of minorities Marriage & divorce codes Property vs. human rights Prohibition, capitol punishment, etc. Social changes in American female & black man Cultural contributions of immigrants to 20th Century America Influence of psychology & philosophy on voters & politicians *Value gap of science (S)*	An overview of sociology & its effects on governmental & economic theories & practices Primitive characteristics evidenced in governments & economics
C. PSYCHOLOGY/PHILOSOPHY Emotions Importance of values Cooperation & conflict Interdependence	Beliefs & values of Western & Eastern societies Psychological & religious bases of wars & conflicts	Interrelationship of geography & economics & the psychological & philosophical attitudes of nations	Causes & effects of wars, conflicts, & cooperative measures on American life in 20th century Prejudice & stereotyping Compromise & democratic solutions as "necessity of life" Property rights vs. human rights	Influence of human drives, psychology, religion & philosophy on political & economic systems of the world *Philosophy of science (S)*
D. POLITICAL SCIENCE Rules & laws Government - types, services, etc. Obligations & responsibilities Elections, political parties, representatives Political ideologies	Selected study of governments, revolutions & dictators Nationalism & imperialism Alliance systems & international organizations Limited vs. absolute monarchies Totalitarianism vs. democracy	Modes of government in 3 of the above areas World organizations: influence Influence of geography on politics	Analysis of important 20th century trends among 3 branches of US government Growth of the presidency & the policy making process Foreign Policy trends Organized groups & institutions	Overview of political theory The parliamentary & presidential systems The one-party state The oligarchy Military dictatorships *Censorship pressures (LA)* Regional & international organizations

E. GEOGRAPHY Natural resources & conservation Topographical features Effects of climate, weather, etc. on man Location of places, regions, continents, etc.	Influence of geography on politics, government, economics, sociology, etc. Migrations & struggles of man for territory	Planets, maps & projections *The Earth in space (S); Geometry: spheres (M)* Earth models *Graphs (M)* Physical, historical, cultural, economic & political geography of selected areas of the world	Interrelationships between geography & ghetto development "Space" as a new frontier to develop *Space* ⊙ *(S)*	The powers of man to combat geographical factors & improve his natural habitat *Man's control of weather (S)*
F. ECONOMICS Workers & occupations Agriculture, industry, stores Earning, spending, saving Transportation, communication	Industrial revolutions & advances Commercial revolutions	Influence of geography on economics & vice versa *Probability (M)* Subsistence economics *Survival of the fittest* ⊙ *(S)* World organizations & economics	Growth of labor unions & big business Modified market economy Self help & welfare programs Gross national product & division of labor	The theory of economics *Statistics (M)* Modern market systems of selected nations Comparative economic systems in emerging nations: India & China

APPENDIX D

SAMPLE MODULES

Name _____ Student Number _____

Step 1. (1431) Objective: Identify five jobs that must be done to produce a TV news program.

Example: Mark the people who are needed to produce a news program:

1. cameraman
2. mailman
3. newscaster
4. grocer
5. reporter
6. lawyer
7. film editor

Words to know: reporter, cameraman, editor, newscaster, studio, messenger, film, control room, mobile studio

USE	DO
a. 1 Communities and Their Needs partners	Read pages 120 and 121. 1. What is a studio? 2. What does a newscaster do? 3. What does a news reporter do?

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

40-114-3 Newspaper (0,00) 69-70 Ed.

Name_____ Student Number_____

Step 1. Objective: Using pictures, tell how a newspaper is made. (1434)

Example: Number the pictures in order to show how a newspaper is made.

paper boy | linotype operator | reporter getting news | newspaper being printed

Words to know: layout department, reporter, teletype, linotype, composing room

USE	DO
a. 1 Your Neighborhood and the World partners	Find out about the layout department of a newspaper. Read page 116. 1. What is a reporter's job? A teletype machine brings news to the office from all over the world. 2. Can you find teletype machines in the picture? 3. Why are pictures important in a newspaper?

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

40-119-3 People in the Neighborhood 69-70 Ed.

Name_____ Student Number _____

Step 1. (1363) Objective: Circle pictures of neighborhood volunteers at work.

Example: Circle the pictures that show the things volunteers do.

Words to know: volunteer

USE	DO
a. 1 friends Our Working World, "Neighbors at Work," record 9	1. Listen to the record. 2. Meet with some friends and talk about these things: -----What is a volunteer? -----What was the neighborhood like where Miss Wald worked? -----What are the rewards for being a volunteer?

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

Step 3. (1365) Objective: Look at pictures of workers. Tell what each worker is doing. Tell how his job helps the people in his neighborhood.

Example: Circle the correct answers:

This man is

1. sawing wood 2. cutting meat

This man helps give the neighborhood

1. food 2. clothes 3. houses

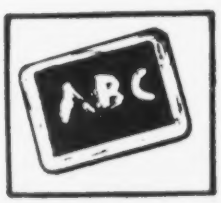
USE	DO
a. 2 pencil Communities and Their Needs	1. Read pages 12-15. 2. Answer these questions in your booklet. -----What are three things people depend on one another for? -----Why does a doctor need a farmer? -----Why does your neighborhood need a barber?

Name _____ Student Number _____

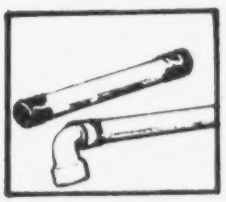
Step 1. (1371) Objective: Tell the things that are needed to build most buildings today.

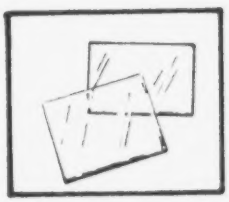
Words to know: log, gravel, cement, concrete, pipes

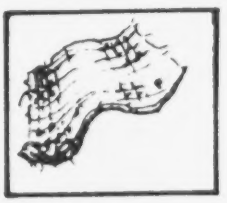
Example: Circle the pictures that show things needed to build most buildings today.



chalkboard


pipes


glass


cloth

USE	DO
a. 1 Science For Here and Now 2 teacher group	1. Read and talk about page 64. 2. Do you know of any buildings made of wood? Tell about them.

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

40-120-3 Constructing Buildings (0,00)

Step 2. (1372) Objective: Interviewing skill. Talk to a building worker to find out what his work is like. Tell a group what he said.

Words to know: tools, stone, brick, glass

USE	DO
a. "The Homes We Live In"	Look at frames 19-31.
b. a building worker	1. Find someone who is a building worker. 2. Ask him to tell you what he does. 3. Ask him what tools he uses. 4. Ask him if he works with stone, brick, wood, glass, or other things. 5. Ask him what he likes about his work.
c. group	Tell a group what the building worker said. You may also tell what you like or don't like about his work.

APPENDIX E

SAMPLE TLU'S AND MODULE TESTS

89-703-2 CHOICES AND CONSEQUENCES (0,00)
69-70 Ed.

(Note: This TLU includes a group discussion. Check with your teacher and make sure there are at least three other students ready to take this module with you.)

STEP 1. OBJECTIVE:
9522 Given a description of a student,

a. describe the relationship between a student's current decisions and his future educational and occupational opportunities;

b. estimate the degree of control a student can reasonably be expected to have over the variety of opportunities open to him (no control, very little control, a great deal of control);

c. indicate how a specific decision a student might make in the near future affects his long-range educational opportunities (expands, limits, has no effect).

USE	DO
Instructional Guide	(a) Read Part 1 of the IG.
	(b) Find three to five other students ready to take this TLU and arrange to meet with them as soon as everyone has completed activities (c) and (d) below.
	(c) Take this TLU home and show it to your parents. Have them read Part 1 of the IG and look over the rest of the TLU.
	(d) Do parts 2 and 3 of the IG at home with your parents. Discuss with them what you think Ted's and Brian's futures will be. (If it is impossible to do Parts 2 and 3 with your parents within three days, then do the activities by yourself.)

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

USE	DO
Choices and Consequences: Outcomes for Ted, American Institutes for Research, 1969, tape Instructional Guide	(e) Meet with your group and have someone get the materials listed in the Use column. While one person is setting up the tape recorder, review Part 2 of the IG and your ideas about what Ted's future will be. (f) Discuss the ideas you and your parents had about Ted's future with the members of your group. Note on Part 2 of your IG the different ideas other members of the group have about Ted's future.
Choices and Consequences: Outcomes for Ted Instructional Guide	(g) Listen to the tape as you read along in Parts 4-7 of the IG. Follow the instructions on the tape.
Choices and Consequences, Outcomes for Brian, American Institutes for Research, 1969, tape Instructional Guide	(h) Meet with your group again and have someone get the needed materials. While the tape recorder is being set up, review Part 3 of the IG and your ideas about what Brian's future will be. (i) Discuss your ideas about Brian's future with the members of your group. Note in Part 3 of your IG the different ideas others in the group have about Brian's future.
Choices and Consequences, Outcomes for Brian Instructional Guide	(j) Listen to the tape as you read along in Parts 8-10 of the IG. Follow the instructions on the tape.

THE END

89-704-2 INTRODUCTION TO DECISION-MAKING (0,00)
69-70 Ed.

Step 1. OBJECTIVE:
9523 Identify the more important educational and occupational decisions to be made by students and the optimum times for making them.

Example: Which of the following is the optimum time for making decisions about what college you want to attend?

A. In the eighth year
B. In the tenth year
C. Early in the eleventh year
D. Late in the twelfth year

USE	DO
Instructional Guide	(a) Read Part 1 of the IG.

Step 2. OBJECTIVE:
9524 Recognize that decisions are tentative and subject to change because
a. your interests and abilities change,
b. the world changes, and
c. you might change your mind because you reassess the implications of your earlier decision.

Example: Jane had always wanted to be a nurse. However, in her freshman year in high school she became more interested in her social studies modules than in her biological science modules. As a result, she decided that she would plan to be a social studies teacher instead of a nurse. Jane changed her decision for which of the following reasons?

A. The world changed.
B. Her interests changed.
C. Her abilities changed.
D. She reassessed the implications of her earlier decision.

USE	DO
Instructional Guide	(b) Read Part 2 of the IG and follow the directions in Sections I and II.

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

89-704-2 INTRODUCTION TO DECISION-MAKING (0,00)

Step 3. OBJECTIVE:
9525 Recognize that some decisions allow you more flexibility to modify your plans than others.

Example: Which of the following decisions made in your freshman year allows you the greatest flexibility to modify your plans?

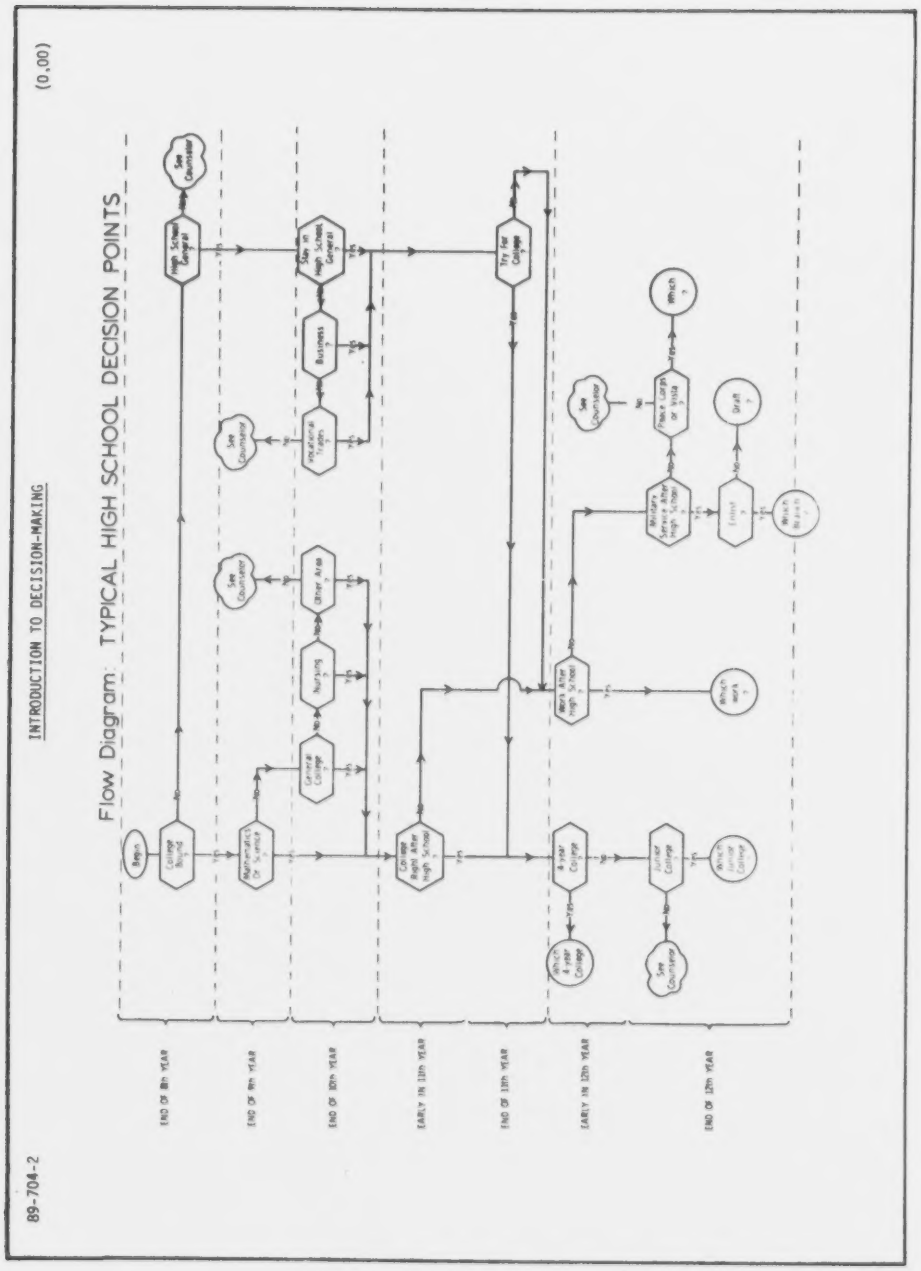
A. A decision to be a carpenter
B. A decision to go to college
C. A decision to go to work right after high school
D. A decision to go into the service right after high school

USE	DO
Instructional Guide	(a) Read Part 3 of the IG.

Step 4. OBJECTIVE:
9526 Given descriptions of students making decisions, recognize examples of decisions which have been made carefully, and identify four steps used in careful decision-making.

Example: Terry, a high school junior, is interested in working in advertising. This year she was Advertising Editor on the yearbook staff. However, she also enjoyed her science modules very much. This summer she plans to be a laboratory assistant for the summer school science classes, to find out what work in science laboratories is like. Terry is

A. defining the problem.
B. identifying the alternatives.
C. gathering information and evaluating the alternatives.
D. choosing the best alternative for her.


89-704-2
INTRODUCTION TO DECISION-MAKING
(0,00)
Flow Diagram: TYPICAL HIGH SCHOOL DECISION POINTS
END OF 8th YEAR
END OF 9th YEAR
END OF 10th YEAR
EARLY IN 11th YEAR
END OF 11th YEAR
EARLY IN 12th YEAR
END OF 12th YEAR

89-703

MODULE TEST 69-70 Ed.

For this test you will need a PLAN First Test Card. Turn to your Student's Module Test Instructions and prepare the Test Card according to the directions you are given. The Module Number for this test is 89-703.

Your answers to all the questions in this test are to be recorded on your PLAN First Test Card.

The following questions all relate to the choices made by Brian #1, Brian #2, and Brian #3 and to the consequences of those choices. If you wish, you may refer to Part 3 and Parts 8-10 of the IG while you answer the questions.

1. Brian #1 delayed making a vocational decision because he didn't know what he wanted to do with his life. One consequence of his delayed decision was that Brian

   A. had time to figure out exactly what kind of work he liked best.
   B. found a job that suited his abilities and interests.
   C. didn't do very well in his college courses.
   D. got a job, but wasn't very enthusiastic about his work.

2. What might Brian #1 have done differently to exert more control over his future?

   A. Learned about occupations related to courses and activities that interested him.
   B. Majored in business instead of history.
   C. Refused the job in his neighbor's factory and waited for something else.
   D. Gone directly to work after high school instead of going to college.

3. Compared to Brian #3, Brian #1 exerted _____ control over his future opportunities.

   A. no
   B. very little
   C. a great deal of

(Go to next page.)

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced: copyright applied for.

89-704

As you read the following story about Betty, think about the four steps of the decision-making process.

BETTY

At the beginning of high school, Betty decided to prepare herself for a secretarial career. In addition to asking for a non-college program of studies, she enrolled in typing, shorthand, and office practice courses. She did very well in these courses, but she also found out that she really enjoyed the biological science modules on her program of studies. Toward the end of eleventh grade, Betty wondered if there were any occupations open to her that required some basic knowledge of science in addition to secretarial skills.

After looking into non-college occupations requiring some knowledge of science, Betty thought she would especially like to find out more about a career as a lab assistant or as a medical secretary. She discussed her two alternatives with her parents, who suggested that she become a medical secretary since she seemed to enjoy the working conditions of a medical secretary, such as meeting new people and using her secretarial skills, more than those of a lab assistant, such as working in a laboratory and performing routine medical tests. Betty thought her parents' recommendation made sense and decided that she would prepare to be a medical secretary. But just to make sure, she interviewed for and was hired for a summer job as medical secretary in a nearby clinic.

9. What was the "problem" that started Betty thinking about changing her goals?

   A. She didn't enjoy her courses.
   B. She wanted a college-oriented program of studies?
   C. She wanted to combine her secretarial skills with her interest in the sciences.
   D. She needed to prepare for a summer job with a doctor.

10. How could Betty have best gathered information about the different alternatives open to her?

    A. By reading a book on technical careers in the sciences
    B. By talking to people in the occupational fields of interest to her
    C. By discussing her decision with adults such as her parents, her counselor, and her teachers
    D. All of the above

11. After finding out what jobs were open to her, Betty thought about them in terms of her interests and abilities. She was

    A. exploring the problem.
    B. identifying the alternatives.
    C. evaluating the alternatives.
    D. choosing the best alternative for her.

* * *

(Go to next page.)

Step 1. OBJECTIVE:
9543 For jobs in LRG VI: Fine Arts, Performing Arts, identify their most highly developed abilities and describe how these abilities might be related to the tasks of these occupations.

Example: Twelfth-grade girls who later became art teachers had well developed abilities in Visualization in Three Dimensions. These abilities might be useful to them in

A. drawing a live model.
B. arranging a field trip to an art gallery.
C. writing a test.
D. lecturing on art history.

USE	DO
Occupations in the Trades and Fine Arts, American Institutes for Research, booklet. (American Institutes for Research: 1970)	(a) Read the Introduction to the booklet. (b) Read the Introduction to LRG VI. (c) Read the job description for either the art teacher or the music teacher. (d) Read the job description for theater arts. (e) Read the profile interpretation for LRG VI and look at the profiles.
Instructional Guide	(f) Do Part 1.

Step 2. OBJECTIVE:
9544 Identify areas of similarity in (a) nature of the work, (b) education and training requirements, and (c) DAP profiles among the jobs in LRG IX: Mechanics, Industrial Trades.

Example: All students planning to enter LRG IX generally have to complete

A. on-the-job training.
B. junior college.
C. college.
D. military service.

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

Step 2. (continued)

USE	DO
Occupations in the Trades and Fine Arts	(a) Read the Introduction to LRG IX. (b) Read the job description for either the machinist or the mechanic. (c) Read the job description for either the electrician or the printing trades. (d) Read the profile interpretation for LRG IX and look at the profiles.
Introductional Guide	(e) Do Part 2.

Step 3. OBJECTIVE:
9545 Given a job in LRG X: Construction Trades that is not described in your instructional materials, describe that job in terms of (a) nature of the work, (b) education and training requirements, and (c) DAP profiles.

Example: As a member of LRG X, a plasterer's work may involve

A. building machines.
B. working with electrical systems.
C. helping to build houses.
D. drawing blueprints for buildings.

USE	DO
Occupations in the Trades and Fine Arts	(a) Read the Introduction to LRG X. (b) Read the job descriptions for the carpenter, plumber, and painter. (c) Read the profile interpretation for LRG X and look at the profiles.
Instructional Guide	(d) Do Part 3.

89-708

MODULE TEST 69-70 Ed.

For this test you will need a PLAN First Test Card. Turn to your Student's Module Test Instructions and prepare the Test Card according to the directions you are given. The Module Number for this test is 89-708.

Your answers to all the questions in this test are to be recorded on your PLAN First Test Card.

---

1. Students planning to enter LRG IX: Mechanics, Industrial Trades, and LRG X: Construction Trades are alike in that they should probably complete

   A. high school.
   B. junior college.
   C. college.
   D. business school.

2. Profiles for workers in LRG IX are alike in that

   A. they all have the same shape.
   B. their average scores are above the average for twelfth grade students.
   C. their most highly developed ability is Introductory Mathematics.
   D. their least highly developed ability is Mechanical Reasoning.

3. Twelfth-grade girls who later became music teachers had highly developed abilities in Abstract Reasoning. These abilities might be useful to a high school music teacher in

   A. leading the marching band.
   B. making arrangements for a school assembly.
   C. conducting the school choir.
   D. understanding the theory of music composition.

4. Salaries for most workers in LRG IX are determined by

   A. the amount they sell.
   B. years of college completed.
   C. union contracts.
   D. sex.

(Go to next page.)

Project PLAN. Restricted Distribution. All rights to this material are reserved, and these units are not to be reproduced; copyright applied for.

5. Whereas workers in LRG IX usually work in factories, workers in LRG X usually work

   A. on construction sites.
   B. at airports.
   C. in repair shops.
   D. in offices.

6. A well-developed ability for theater arts workers is Reading Comprehension. For which of the following work tasks might this ability be most useful?

   A. Raising money for a play
   B. Designing costumes
   C. Interpreting the lines of a play
   D. Painting the sets for a play

* * *

Hi! My name is Sam Snoo, and I am a roofer (LRG X). From your knowledge of jobs in LRG X, answer the following questions (Items 7-9) about me and my job.

7. On his job, Sam usually works

   A. in a factory.
   B. in an office.
   C. outdoors.
   D. in a store.

8. The most highly developed abilities on Sam's DAP profile were

   A. Visualization in Three Dimensions and Mechanical Reasoning.
   B. Word Functions and Disguised Words.
   C. Arithmetic Reasoning and Introductory Mathematics.
   D. English Total and Creativity.

9. Sam probably learned his trade in which of the following ways?

   A. High school courses
   B. College
   C. Business school
   D. On-the-job training

* * *

(Go to next page.)

89-711-2 CAREER PLANNING PRACTICE II (0,00) 69-70 Ed.

Step 1. OBJECTIVE:
9555 Given a description of a student and of a decision that he made, describe the most probable consequences of that decision for the student.

USE	DO
Instructional Guide	(a) Read Part 1 with your parents.
	(b) Read Part 2.
Sample Cases of Student Career Planning II, American Institutes for Research, Booklet (American Institutes for Research: 1970)	(c) Read the description of Mary.
Instructional Guide	(d) Do Part 3.

Step 2. OBJECTIVE:
9556 Given a description of a decision made by a student and of the consequences of that decision, identify an alternative decision that could have been made and tell why you think it might also have been a good decision.

USE	DO
Instructional Guide	(a) Read Part 4.
Job Families and Jobs: A Reference Manual for PLAN Student-Parent Goal Formulation, American Institutes for Research, Booklet (American Institutes for Research: 1970)	(b) Read Sections I, II, and III.
Instructional Guide	(c) Do Part 5.
	(d) Do Part 6.

Copyright © 1970 by Westinghouse Learning Corporation. All rights reserved. Use other than as a component of the PLAN Educational System is not authorized. Printed in the U. S. A.

89-713-2 PLAN STUDENT PARENT GOAL FORMULATION PLAN 70

Step 1. OBJECTIVE:
9565 Interpret your DAP scores and draw your DAP profile.

USE	DO
Instructional Guide	(a) Read Part 1.
Instructional Guide DAP Score Worksheet	(b) Do Part 2.
Handbook for DAP Score Interpretation	(c) Read the Introduction.
	(d) Read pp. 1-2.
Instructional Guide *Handbook for DAP Score Interpretation*	(e) Do Part 3.
Instructional Guide *Handbook for DAP Score Interpretation* DAP Score Worksheet	(f) Do Part 4.
Instructional Guide	(g) Do Part 5.

Step 2. OBJECTIVE:
9566 Relate your developed abilities to those of workers in various occupations and LRG's.

USE	DO
Instructional Guide	(a) Read Part 6.
	(b) Read Part 7.
Instructional Guide *Handbook for DAP Score Interpretation* DAP Score Worksheet	(c) Do Part 8 if you wish (optional).
Instructional Guide DAP Score Worksheet *Job Families and Jobs: A Reference Manual for PLAN Student-Parent Goal Formulation*	(d) Do Part 9 if you wish (optional).

Copyright © 1970 by Westinghouse Learning Corporation. All rights reserved. Use other than as a component of the PLAN Educational System is not authorized. Printed in the U. S. A.

APPENDIX F

SAMPLE PROGRAMS OF STUDY

POS #1

PROGRAM OF STUDIES 0917 LADUCA CINA

003 IMMACULATE HEART LEVEL 4 MATHEMATICS FALL 1970

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO OF TIMES TESTED	DATE START	DATE FINISH
		YOUR TEST RESULTS SHOW THAT YOU SHOULD REVIEW THE OBJECTIVES OF THESE MODULES WHICH YOU COMPLETED LAST YEAR. DO NOT SUBMIT STATUS OR TEST CARDS FOR THEM.			
	20-193-3	PLACE VALUE TO FOUR DIGITS AND EXPANDED NOTATION			
		YOUR TEST RESULTS SUGGEST THAT YOU KNOW SOME OF THE OBJECTIVES OF THESE MODULES IN YOUR PROGRAM OF STUDIES. AFTER REVIEWING EACH MODULE CAREFULLY, CONSIDER CHALLENGING IT.			
	20-172-3	SUBTRACTION OF THREE-DIGIT NUMBERS			
	20-197-3	MULTIPLICATION WITH REGROUPING			
		THE FOLLOWING MODULES ARE SUGGESTED FOR YOUR PROGRAM OF STUDIES FOR THIS YEAR.			
	20-172-3	SUBTRACTION OF THREE-DIGIT NUMBERS			
	20-197-3	MULTIPLICATION WITH REGROUPING			
	20-199-3	INTRODUCTION TO DIVISION			
	20-160-3	DIVISION PROCESS			
	20-211-3	POINTS, LINES, AND ANGLES			
	20-212-3	PROPERTIES OF POLYGONS			
	20-213-3	CIRCLES			
	02-202	PLAN ACHIEVEMENT TEST			
	20-292-3	PLACE VALUE TO SEVEN DIGITS			
	20-202-3	PROPERTIES OF WHOLE NUMBERS--MULTIPLICATION			
	20-203-3	MULTIPLICATION ALGORITHM			
	20-204-3	DIVISION ALGORITHM			
	02-200	PLAN ACHIEVEMENT TEST			
	20-206-3	THE FRACTION SYMBOL			
	20-207-3	FRACTIONS ON A LINE SEGMENT			
	20-208-3	FRACTIONS ON THE NUMBER LINE			
	20-209-3	EQUIVALENT FRACTIONS			

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO OF TIMES TESTED	DATE START	DATE FINISH
	20-210-3	IMPROPER FRACTIONS			
	02-201	PLAN ACHIEVEMENT TEST			
	20-167-3	MEASUREMENT OF LENGTH AND MAP SCALES			
	20-169-3	TIME 3			
	20-293-3	ADDITION AND SUBTRACTION OF FOUR-DIGIT NUMBERS			

POS #2

PLAN PROGRAM OF STUDIES 0017 LADUCA GINA

003 IMMACULATE HEART LEVEL 4 SOCIAL STUDIES FALL 1979

MODULE OR SET	MODULE NUMBER	MODULE NAME	NO. OF ATTEMPTS	DATE PASSED	DAYS TAUGHT
		THE FOLLOWING MODULES ARE SUGGESTED FOR YOUR PROGRAM OF STUDIES FOR THIS YEAR.			
	40-177-3	MAP STUDY--REGIONS OF THE WORLD			
	40-178-3	MAP STUDY--LAND AND WATER			
GROUP	COMMUNITY TYPES	TAKE ANY 2 OF THE FOLLOWING 4 SETS.			
SET 1 47-011	ARCTIC COMMUNITIES	TAKE ALL 2 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-011.			
	40-157-3	ARCTIC COMMUNITIES 1			
	40-158-3	ARCTIC COMMUNITIES 2			
SET 2 47-012	TROPICAL RAIN FOREST COMMUNITIES	TAKE ALL 2 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-012.			
	40-160-3	TROPICAL RAIN FOREST COMMUNITIES 1			
	40-161-3	TROPICAL RAIN FOREST COMMUNITIES 2			
SET 3 47-013	MOUNTAIN COMMUNITIES	TAKE ALL 2 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-013.			
	40-163-3	MOUNTAIN COMMUNITIES 1			
	40-164-3	MOUNTAIN COMMUNITIES 2			

MODULE OR SET	MODULE NUMBER	MODULE NAME	NO. OF ATTEMPTS	DATE PASSED	DAYS TAUGHT
SET 4 47-010	DESERT COMMUNITIES	TAKE ALL 2 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-010.			
	40-154-3	DESERT COMMUNITIES 1			
	40-155-3	DESERT COMMUNITIES 2			
	40-166-3	COMPARING COMMUNITIES			
	40-169-3	A PLANNED COMMUNITY			
	40-207-2	DEFINING HUMAN PROBLEMS			
	40-208-2	SEARCHING FOR INFORMATION			
	40-212-2	ATTACK A PROBLEM--NATURAL RESOURCES			
	40-209-2	YOUR STATE			
	40-206-2	USING MAPS			
	40-205-2	LEGENDS AND SYMBOLS			
	84-200	PLAN ACHIEVEMENT TEST			

POS #3

PLAN PROGRAM OF STUDIES 1824 GONZALES MARIA

003 IMMACULATE HEART LEVEL 2 SOCIAL STUDIES FALL 1970

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO. OF TIMES TEST	DATE STARTED	DATE FINISHED
		YOUR TEST RESULTS SUGGEST THAT YOU KNOW SOME OF THE OBJECTIVES OF THESE MODULES IN YOUR PROGRAM OF STUDIES. AFTER REVIEWING EACH MODULE CAREFULLY, CONSIDER CHALLENGING IT.			
	40-120-3	CONSTRUCTING BUILDINGS			
	40-116-3	WHERE WE GET OUR FOOD			
	40-117-3	HOW WE USE OUR FOOD			
	40-118-3	WHERE WE GET OUR CLOTH			
		THE FOLLOWING MODULES ARE SUGGESTED FOR YOUR PROGRAM OF STUDIES FOR THIS YEAR.			
SET	47-008	NEIGHBORHOOD BUILDINGS TAKE ANY 1 OF THE FOLLOWING 2 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-008.			
	40-120-3	CONSTRUCTING BUILDINGS			
	40-121-3	FACTORIES IN THE NEIGHBORHOOD			
SET	47-003	NEIGHBORHOOD TYPES TAKE ANY 2 OF THE FOLLOWING 4 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-003.			
	40-102-3	SMALL-TOWN NEIGHBORHOODS			
	40-103-3	BIG-CITY NEIGHBORHOODS			
	40-104-3	SUBURBAN NEIGHBORHOODS			
	40-105-3	FARM NEIGHBORHOODS			

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO. OF TIMES TEST	DATE STARTED	DATE FINISHED
SET	47-004	NEIGHBORHOOD INSTITUTIONS TAKE ANY 2 OF THE FOLLOWING 3 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-004.			
	40-107-3	STORES IN THE NEIGHBORHOOD			
	40-108-3	GOVERNMENT IN THE NEIGHBORHOOD			
	40-110-3	SCHOOLS IN THE NEIGHBORHOOD			
	84-100	PLAN ACHIEVEMENT TEST			
SET	47-005	COMMUNICATION TAKE ANY 2 OF THE FOLLOWING 3 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-005.			
	40-111-3	COMMUNICATION			
	40-112-3	MASS MEDIA			
	40-113-3	TV PROGRAM			
SET	47-006	BASIC NEEDS TAKE ALL 3 OF THE FOLLOWING 3 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-006.			
	40-116-3	WHERE WE GET OUR FOOD			
	40-117-3	HOW WE USE OUR FOOD			
	40-118-3	WHERE WE GET OUR CLOTH			
	84-101	PLAN ACHIEVEMENT TEST			
	40-129-3	GETTING THERE FROM HERE			

COMPLETION CODE	MODULE NUMBER	MODULE NAME	NO. OF TIMES TEST	DATE STARTED	DATE FINISHED
SET	47-007	NEIGHBORHOOD CHARACTERISTICS TAKE ANY 1 OF THE FOLLOWING 3 MODULES. WHEN YOU ARE READY TO BEGIN WORK ON THIS SET, ASK YOUR TEACHER TO START SET NUMBER 47-007.			
	40-109-3	HOW NEIGHBORHOODS CHANGE			
	40-119-3	PEOPLE IN THE NEIGHBORHOOD			
	40-124-3	HOW NEIGHBORHOODS SOLVE PROBLEMS			
	40-191-3	WHAT IS A COMMUNITY?			
	40-192-3	MY OWN COMMUNITY AND ITS RESOURCES			
	40-193-3	A LOOK AT OTHER COMMUNITIES			
	40-177-3	MAP STUDY--REGIONS OF THE WORLD			
	40-178-3	MAP STUDY--LAND AND WATER			